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William Casson of Thorne — Martin Limbert

**Lichen flora of the West Yorkshire conurbation: Supplement IV
(1984–90) — M. R. D. Seaward and A. Henderson**

**A further study of the moss mites of the Lake District (Acari:
Oribatida) — Edmund L. Seyd and Matthew J. Colloff**

**A review of the smelt (*Osmerus eperlanus* L.) in the Humber and
Tees estuaries, their tidal tributaries and the tidal waters of
Lincolnshire — C. A. Howes and B. R. Kirk**

**Historical records of the burbot *Lota lota* (Linnaeus 1758) in the
River Hull, North Humberside — Barry R. Kirk**



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A QUARTERLY JOURNAL OF NATURAL HISTORY FOR THE NORTH OF ENGLAND

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WILLIAM CASSON OF THORNE

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INTRODUCTION

William Casson, an inhabitant of Thorne in Yorkshire for virtually his entire life, is usually recalled as the first resident chronicler of the town and its rural hinterland. The three editions of his book *The History and Antiquities of Thorne, with some account of the drainage of Hatfield Chase*¹ are his most lasting memorial, remaining a standard local reference even today, over 160 years beyond their first appearance. He is also remembered in other, minor, ways, for example as the discoverer of Fen Buckler-fern *Dryopteris cristata* in Yorkshire, and as the author of a published address to the Thorne Literary & Scientific Association.² A much more spectacular legacy, which even now partially survives, existed some way out of the town, on the edge of Thorne Moors. Here, William established a garden, and with his brother John was later involved with commercial plant raising. Today, rhododendrons *Rhododendron*, Sheep-laurel *Kalmia angustifolia* and Springbeauty *Montia perfoliata* all attest to former interest in and activity on the peat moorland's south western flank. There are no physical clues of responsibility for this alien floral element, yet the written evidence links it undeniably with William and his brother. In so doing, it also reveals a much more significant horticultural enterprise than was hitherto appreciated.

WILLIAM CASSON'S LIFE

William was born at Thorne on 23 October 1796, son of Quaker parents, Mordecai and Mary Casson. He remained a bachelor throughout his life, but had two brothers and one sister. One of these brothers, also named Mordecai, emigrated to North America, residing during at least his later years in Tuscarora, to the east of Shenandoah in the 'Quaker State' of Pennsylvania.³ His other brother, John Calvert, lived at Thorne, and died there in 1878,⁴ as did their sister Sarah in the following year.⁵ William himself attained the age of 89, although his health was not always good. He also had an accident to his hip, which caused a slight lameness and disease of the foot. He subsequently suffered from it a good deal at times, and ultimately died of erysipelas on 22 January 1886. Despite extreme old age, he remained in possession of almost all his faculties, only the loss of an eye, again in an accident,⁶ causing him impairment.

William had only a rudimentary education, at the vicarage school under the Rev. Eric Rudd. He was subsequently apprenticed to a firm of grocers, also perhaps within the Casson family, at Gainsborough in Lincolnshire. He later succeeded to a grocery business in Thorne, established in 1793 by his paternal grandfather, Mordecai Hord Casson. Population census returns, trade directories⁷ and an advertisement in *The Gardeners' Year-book and Almanack, 1874*⁸ chart the commercial progress of William and John, who formed what became a successful and respected firm, based on the family's interests. Their business, which encompassed a variety of activities, included tallow-chandling, tea dealing, grocery, drapery, malting, seed dealing, horticulture, farming, even brick-making in the mid-1850s. William was generally described in population census returns as a draper and grocer, although as a 'Grocer Seedsman & Farmer jointly with John C. Casson' in 1871. John was usually entered as a farmer and—from 1861—seed merchant. At the 1871 census, the partners employed six men and three boys. They owned family property east of Thorne at Clap Gate Farm (96 acres) and also rented a further 39 acres of local farmland. At the time of John's death in 1878, he was then the 'active partner in the firm of W. and J. C. Casson, seedsmen, grocers, and farmers'.⁹ The 1881 census data record William as a draper and grocer 'retired from business'.

William was a lifelong Quaker, although the number of Friends at Thorne was relatively small, with many of them belonging to the Casson family. Until c. 1846, William's interest was a formal and traditional one, occasioned by familial custom, but from then on he became an 'eager glad disciple',¹⁰ intent on spreading a similar joy in his faith. He was closely involved with Thorne Preparative Meeting, and was a member of Balby Monthly Meeting. He became a minister in March 1870,¹¹ and visited other meetings at times, including those in the Yorkshire Dales, often in the company of a Scarborough Quaker minister, Henry Hopkins, himself once a grocer.¹² William was sometimes requested to speak at Wesleyan class meetings in the Thorne neighbourhood, and when occasionally visiting hydropathic establishments to help restore his health, he was not infrequently asked to conduct family worship there. He also carried on a considerable correspondence in a similar vein.

Upon his death, William was interred at the Friends' burial ground off Church Lane in Thorne. His long and benevolent connection with the town, coupled with his high moral and social character, caused him to be heeded with popularity and esteem. His death occasioned several appreciative notices,¹³ although one Quaker obituarist¹⁴ commented with an unintentional edge that William 'was not endowed with large natural abilities, but he showed how valuable a man may be without possessing any great gifts'. The high regard which William drew to himself partially arose from his obvious interest in the welfare of the district's poor; he exhibited a particular concern for the inmates of the Thorne Union workhouse. Here, he was a regular visitor and benefactor, and for some years held a religious service on Sunday afternoons. Indeed, during these years the workhouse management felt it unnecessary to have the expense of a paid chaplain. William was also fond of children; he

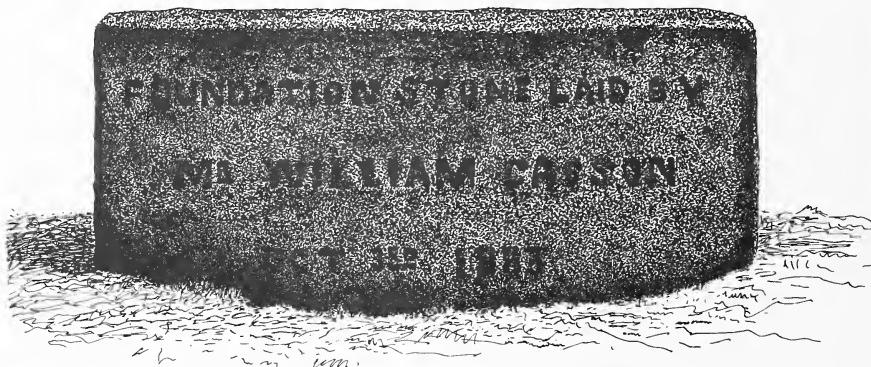


FIGURE 1

The foundation stone of Thorne Town Hall, laid in 1883. The building is now demolished, though the stone is preserved in Thorne Memorial Park.

liked to invite parties of young people to his house in Silver Street for tea, with a 'ramble on the moors afterwards in search of wild flowers, which he loved to gather and to cultivate'.¹⁵

William was a staunch liberal, and during his long lifetime 'occupied several parish offices with great ability and presided at most of the public and parish meetings for a long series of years'.¹⁶ He was, for example, from 1845–60 surveyor of highways, as his father had been. Until only a year or so before his death, William was one of the waywardens, a position he only relinquished due to failing health, possibly arising from his hip injury. As surveyor of highways he was appointed annually, and worked assiduously, although there was no salary attached. His last public act was the laying of the foundation stone of Thorne Town Hall on

3 October 1883. He mounted the stone to give his address in which, as the town's oldest inhabitant, he outlined the principal events that had taken place there since the beginning of the century, his recollections extending back to c. 1803.¹⁷

William's other activities were similarly locally directed and of long duration. He held a practical interest in the reclamation of Thorne Moors where, with John, he owned 50 acres of 'unproductive moor' beyond Clap Gate Farm. He was a trustee to the Thorne Moors Owners, and an original director of the Thorne Moor Improvement Co. of 1861.¹⁸ He was for many years the chairman of the Thorne Gas-Light & Coke Co., formed in 1836. William was one of the first promoters of the Thorne Agricultural Show (established 1853), and was an active member of the Thorne Agricultural Association for many years. The decorative grottoes and floral displays at the shows owed much to his inventive artistry. The latter was not, however, entirely altruistic, as recalled in 1886:¹⁹

In years gone by long ago, the very first man we used to encounter on Thorne Show ground ... was Mr. Casson, busy with his grottoes ... Mr. Casson was a Quaker, and had an eye to business ... and in some nook or corner of those charming little retreats was certain to lurk a sufficiently suggestive reminder that Mr. Casson was a seed merchant, and that those who wanted giant wurzels and abnormal turnips might do worse than consult him or his partner on the subject.

Despite his limited formal education, William displayed intellectual ability when, at the age of 33, he completed his *History and Antiquities of Thorne*. It is somewhat ironic that William should be remembered as the writer of the book and its subsequent imprints, as each actually appeared anonymously. Nevertheless, the evidence of authorship is conclusive.²⁰ It is regretted that no appraisal has been located which evaluates William as a local historian, or judges the significance of his part in an understanding of the region's history.

WILLIAM CASSON AS A NATURALIST

The *History and Antiquities of Thorne* also reveals its author's interest in natural history. This is especially evident in the chapter outlining Thorne Moors, William's published description of its surface being the first.²¹ A number of species are alluded to in the chapter, particularly of flowering plants and birds, but also memorable taxa from other groups, like snakes and the biting Nematocera. William was seemingly keenest on botany, and the available evidence largely restricts his natural history to Thorne Moors. However, his interests probably also encompassed the larger region of Thorne parish and adjacent parts. He may have had a similar outlook to Gilbert White, who died only three years before William's birth. The latter was aware of *The Natural History and Antiquities of Selborne*, citing White²² in discussing Yews *Taxus baccata* in churchyards. This view of William's attitude is given credence by noting his choice of verse, derived from Oliver Goldsmith's 'The Traveller', on the title-page of each edition of the *History and Antiquities of Thorne*. William seemed satisfied with his geographical lot, which he clearly felt was worthy of investigation and documentation. His published work reinforces this interpretation, indicating a sympathetic rapport with Thorne and its region.

With his interests and outlook, it was natural that William should be involved with the Thorne Literary & Scientific Association, which was formed in 1836.²³ He served on the administering committee, and occasionally lectured on botanical subjects. On the Association's sixth anniversary, at its annual general meeting of 21 January 1842,²⁴ William delivered an address to the assembled company, in verse, on the acutely irritating midges *Culicoides* of Thorne Moors, referring to them as 'colicoides punctata'. The subject was prompted by memories of an earlier Association meeting at his moorland garden (*q.v.*). He continued with poetic allusions to the botanical interest of Thorne Moors, and in closing, offered his best wishes to 'our little band'. The address was published for the Association, in an augmented form, by Joseph Mason.²⁵

C. W. Hatfield²⁶ regarded William as an 'intelligent and enthusiastic observer of nature', and some of the Thorne botanical records which the former included probably emanated

from William. An obituarist²⁷ noted that he was:

... always known as a good botanist, and a successful cultivator of plants and flowers, and his garden on the moors was often visited by naturalists and botanists from a distance.

William guided the Sheffield Field Naturalists' Society on their excursion to Thorne Moors on 21 June 1865.²⁸ This is the earliest known visit to the area by a society based beyond Thorne,²⁹ though there is no later evidence to link William with visits by any other organisations. He was firmly a naturalist of his time, associated with the earliest phase of botanical interest on Thorne Moors, when the site was seen as a rich source of herbarium specimens and of records of broad geographical significance.³⁰ The increasingly sophisticated and regulated attitude to Thorne Moors botany which appeared in the 1870s, mirroring wider changes, was engendered from beyond Thorne. Although the third edition of William's *History and Antiquities of Thorne* appeared during that decade, the botanical data had not been altered from that of the 1869 edition.

The botanist James Backhouse (1825–90) described William as 'my now aged friend' in 1884.³¹ In examining natural history at Thorne, this is only one example of a significant Quaker interest in the nineteenth century. In addition to William, and another Thorne Quaker botanist, William Harrison,³² non-resident Quaker naturalists like Backhouse, above, Thomas Le Gay Brewerton³³ and John Heppenstall³⁴ had links with Thorne Quakers, and these would repay further study. Indeed, it is likely that William's botanical contacts were largely Quaker ones. As noted, an obituarist observed that the garden property on the edge of Thorne Moors was often visited by naturalists. A little further into the moor was 'Scheuchzeria Well', as mapped and named in the 1850s.³⁵ This moorland pool was probably the most accessible destination for seeking specimens of Thorne's most celebrated botanical native, Rannoch-rush *Scheuchzeria palustris*.³⁶ This species was first found by William Harrison, in 1831; it was known in the field to William Casson by 1841.³⁷ It is likely that William's visitors travelled to the garden, and were then guided over the moor to the nearby Rannoch-rush station. It was comparatively easy to reach, and was presumably the one their guide knew best. It is possible that William was one of very few botanists who had local and consistent knowledge of Rannoch-rush on the accessible Thorne side of the moorland. William Harrison emigrated to Indiana in North America sometime after his discovery,³⁸ and other known collectors were often neither local nor persistent. By the time the 'investigative' botanists of the 1870s and later began to know the moor, the species had all but succumbed to drainage; only Dr F. A. Lees found a single flowerless example, in 1870.³⁹ The press reports of the 1865 excursion by Sheffield naturalists do not refer to Rannoch-rush, although the garden region was visited and commoner plants reported on. Scheuchzeria Well would not have been missed had so renowned a 'botanic lion'⁴⁰ still been growing there. Indeed, it only marginally survived into the following decade anywhere on the moor. The unique place name 'Scheuchzeria Well' may have been coined by William, becoming formalised when mapped. Who else but local landowners and their employees could provide detailed place-names to the surveyors of the Ordnance Map Office, and who but William would be so familiar with that botanical site?

James Backhouse made his comment of friendship in 1884 in a published note attributing the discovery of Fen Buckler-fern in Yorkshire to a Thorne Moors gathering made by William in 1856. The latter had actually published it as a Thorne species in 1869.⁴¹ This record, and indeed William himself, were initially unknown to Dr F A Lees, who however subsequently included the record, and attributed it, in the *Naturalist* and in his *West Yorkshire Flora*.⁴² This is the only known occasion when any of William's data recognizably found their way into one of the county or infra-county floras. Not surprisingly, nothing written by William is included in the bibliography given by Lees.⁴³ He was however, quoted by Rev. E. A. Woodruffe-Peacock,⁴⁴ although the exact data derived cannot be determined. There is no evidence of an herbarium at Thorne, although William did on occasion collect notable specimens,⁴⁵ both for identification by experts and as herbarium gifts for others. The latter was particularly true of Rannoch-rush.

THE MOORLAND VENTURE

The land extending from Thorne towards Thorne Moors was divided into a multitude of thin strips, known locally as cables, each identically aligned and bounded by dykes. These were the result of the plots of land to the east of Thorne being gradually extended over many decades,⁴⁶ thrusting eastwards in ever lengthening ribbons as the peat was removed and the ground beneath cultivated. Thus the edge of the moorland was continually, though fitfully, receding from the town. The digging of Thorne Waste Drain in 1815 along the south-western edge of the surviving peat unwittingly created a barrier to further reclamation along the cables, with the peat and any reclaimed plots to the west rendered relatively inaccessible. The excavation of the drain was first suggested by William's father,⁴⁷ when he worked the family property of Clap Gate Farm, its cable of land extending from Clap Gate Road eastwards to the peat. At the apportionment of rent charges in lieu of tithes in 1840, this was the only cable extending east of Thorne Waste Drain which incurred a charge on its exclave. The latter was described as comprising 'Grass', and amounted to 4 acres 1 rood 16 perches.⁴⁸ Three further reclaimed plots beyond Thorne Waste Drain, lying immediately south of the Casson cable, did not attract a rent charge in 1840, suggesting that they were not then in cultivation. Quite when these three also came into the possession of the Casson family is not exactly known.

Despite its designation as 'Grass', the original cable exclave was actually utilised, as inferred, in an imaginative and novel way, as the site for an 'experimental Garden'⁴⁹ created by William.⁵⁰ It was perhaps inevitable that, should this trial be successful, it was likely to be eventually extended southwards in some way. The actual origins of the garden are obscure. There is no indication of it on any traced map from the 1820s, including the large scale 1825 Enclosure Award map,⁵¹ although the reclaimed Casson piece beyond Thorne Waste Drain is shown. Also, there is no allusion in the first (1829) edition of William's *History and Antiquities of Thorne*. Nevertheless, the garden was certainly in evidence in July 1840,⁵² suggesting its likely origin sometime in the 1830s.

The first substantial reference to the garden is that contained in the 'Explanatory Notes' accompanying the published version of William's 1842 address to the Thorne Literary & Scientific Association. The partially reclaimed eastern extremities of the cables could not be farmed so well as the other parts, and their utilization was sometimes solved by the creation of plantations of larch *Larix*, oak *Quercus* and other trees. William, in writing for the 1842 booklet, observed:

At the edge of the morass ... is a small plantation of Larch, and immediately adjoining it is an experimental Garden, which a year or two ago was kept in very neat order, and attracted a good deal of attention, not only from the novelty of its situation, but also for the beauty and vividness of colouring in the flowers it produced, amongst which may be mentioned those of the Rose; the Rhododendrum [*sic!*]; Fuchsias; Deutzias; Salvias, scarlet [,] purple, and patans [*sic!*]; Rhodanthe Manglesii; Nymphillas; and many other choice plants for which a peat soil is favourable.

William added that on the bank of cut peat demarcating the northern boundary of the garden, a moss collage of mostly exotic mammals, glass-eyed and almost life-sized, had been created. In one corner of the garden a small rill issued from the peat, above which the word 'Temperance' had been inserted into the peat in white moss. When William was writing in 1842, all these adornments had already been destroyed by a severe frost. Under the shade of the trees in the garden, an arbour of Heather *Calluna vulgaris* had been formed, and rustic seats⁵³ were provided for visitors:

Here, in the summer season parties have frequently been assembled to take tea. The neat tea services used on those occasions were purchased by subscription a year or two ago, and generously presented by the Ladies of Thorne.

Those days were remembered by the Doncaster historian John Tomlinson. Although born at Epworth in 1824, Tomlinson's early years were spent at Thorne. He moved to Doncaster at about the age of 30,⁵⁴ and it is thus likely that his published memories of the garden⁵⁵

predate c. 1854. He recalled ‘fuchsias, dahlias, rhododendrons and various other flowering shrubs which delight to suck nutriment from a turfey soil’. The only visual representation of the garden at this time is that of the 6” O.S. map of 1853. The garden is shown as mostly surrounded by planted conifers, and with a ‘Summer House’ at its south eastern corner: perhaps an essential refuge from the midges. There was no representation at that time of a flanking horticultural scheme.

From the 1860s, references to the garden become subsumed in generalisations about the subsequent horticultural enterprise of W. & J. C. Casson on at least the three cable heads to the south. The garden itself almost certainly ceased to exist separately, becoming incorporated with the other plots. The name ‘Casson’s Garden/Gardens’ became confusingly transferred to the whole of the four cultivated units east of Thorne Waste Drain. Although the venture was jointly owned, it seems that John was the most active partner. Much less is known of him than of his more renowned brother. However, he played his part in Thorne life,⁵⁶ and died in 1878 at the age of 71:

As an owner, along with his brother, Mr. William Casson, of a somewhat considerable extent of land, as a practical agriculturist, and as one of the steady-going improvers of the Thorne [Moor], the deceased gentleman occupied a prominent position.⁵⁷

The first positive data on the horticultural undertaking are gained from the 1869 edition of the *History and Antiquities of Thorne*:

Some peat is annually sent off from the moor to nurserymen or gentlemen at a distance, either by rail or vessel, as American plants,⁵⁸ azalias [*sic!*], kalmias, andromedas, rhododendrons, and heaths flourish splendidly in a peaty soil. Thousands of rhododendrons are raised from seed on Thorne Moor by W. and J. C. Casson, for sale.

By the 1870s, the business was undoubtedly well-established, with its scale revealed by a stock list issued in 1872.⁵⁹ In it, following a hand-coloured engraving of Lawson Cypress *Chamaecyparis lawsoniana* cv. *Erecta Viridis*, a descriptive list of the plants available was presented. These featured 197 named hybrid rhododendrons (‘Aclandianum’ to ‘Zampa’); also 10 ‘Azalias’ and ‘Rhodora canadense’, all now included under *Rhododendron* (*s.l.*). Many of these rhododendron taxa, derived from leading British and European growers, are now lost to commerce.⁶⁰ Interestingly, the catalogue noted that:

W. and J. C. CASSON have, in addition, a large stock of Hybrid Rhododendrons, named, of their own raising, which can be recommended as fine Plants, with good foliage, and the flowers in bold trusses, of good colours, well marked or spotted.

Unfortunately, none of these rhododendrons seem to have survived as named hybrids, as evidenced by their failure to feature in the International Rhododendron Register. Also listed for sale, under ‘Shrubs and Plants’, were examples from at least the following genera: *Abies*, *Andromeda*, *Araucaria*, *Berberis*, *Bryanthus*, *Cedrus*, *Chamaecyparis*, *Cortaderia*, *Cotoneaster*, *Crataegus*, *Cupressus*, *Deutzia*, *Erica*, *Euonymus*, *Garrya*, *Ilex*, *Juniperus*, *Kalmia*, *Ledum*, *Leiophyllum*, *Magnolia*, *Mahonia*, *Mentziesia*, *Myrica*, *Myrtus*, *Pernettya*, *Pieris*, *Prunus*, *Raphiolepis*, *Retinospora*, *Ribes*, *Sequoia*, *Skimmia*, *Thuja*, *Thujopsis*, *Vinca*, *Yucca* and *Zenobia*. It was also noted that three or four specimen rhododendrons were growing on ground occupied by W. & J. C. Casson well away from the moorland, immediately next to Thorne South railway station. They were intended as a more visible and accessible advertisement to the people of Thorne, and to others travelling on the railway.

Copies of the 1872 list which were issued in (at least) 1874 had an extra sheet stuck in, observing that attention was drawn to rare and new additions to the ‘collection on the Moors’ — though there is no hint of what these were — as well as to the extra showground alongside the railway. This land, it was noted, had been purchased from the Manchester, Sheffield & Lincolnshire Railway Co. Having been partly filled with peat from Thorne Moors, it was planted early in 1874 with ‘RHODODENDRONS, AUCUBIAS, and SKIMMIA OBLATA’. In *The Gardeners’ Year-book and Almanack, 1874*,⁶¹ W. & J. C. Casson advertised their

hardy rhododendrons and other shrubs and trees: 'A List and Description sent on application, and a supply of Peat if required'. On John's death in 1878, it was retrospectively remarked:⁶²

He took an especial interest in gardening, and the Moors, from the taste and skill displayed in the garden under his superintendence, have been a source of attraction, not only to residents, but to visitors as well. The rhododendrons and azaleas grown in this garden have obtained for Mr. [John] Casson a celebrity not confined to this country, large consignments having been sent to America,⁶³ where they have been considered very notable specimens of their class.

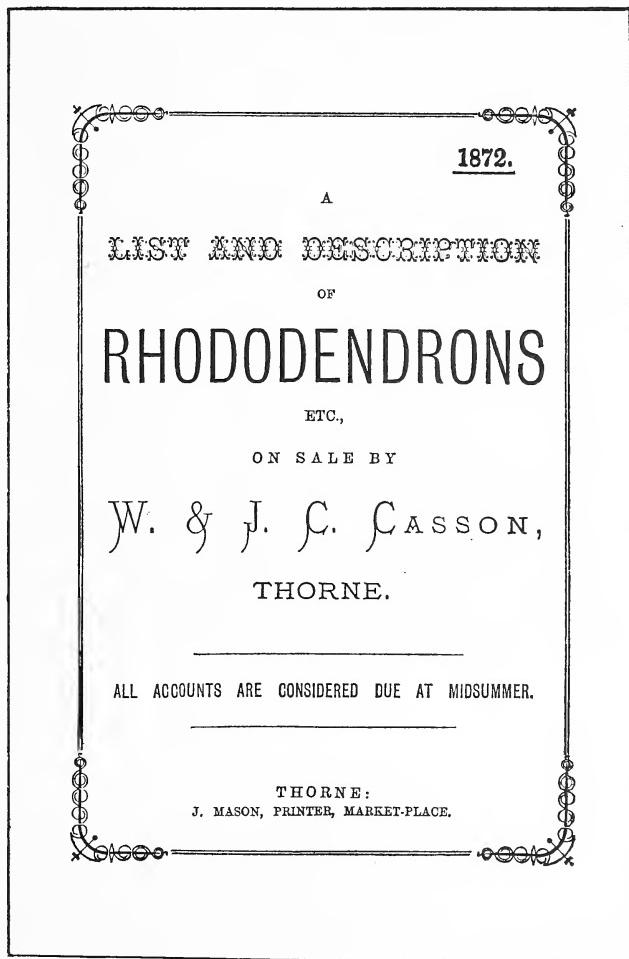


FIGURE 2

The cover of the W. & J. C. Casson horticultural stock list issued in 1872.



FIGURE 3
Sheep-laurel near Casson's Garden, 1989. Photo G. Davidson

Information from beyond the 1870s is regrettably sparse, but John's death probably genuinely marked the beginning of the end. When William died, in 1886, John's son Francis succeeded to the family's interests and responsibilities in the Thorne area.⁶⁴ He was a grocer and seed dealer,⁶⁵ but had wider concerns,⁶⁶ including a knowledge of Thorne Moors. Here, he acted as guide for the Yorkshire Naturalists' Union in 1881 and Ackworth School Natural History Society in 1888.⁶⁷ His unexpected death on the last day of 1888 ended the family name in Thorne: he was 37 and unmarried. The grocery and seed business was acquired by A. T. Baker, who was issuing price-lists in his own name by 1891.⁶⁸ It is known that Francis had entertained the local workhouse children 'at picnics at his gardens on the Moors'.⁶⁹ This included 1885, when after 'a ramble on the moors, the children and a few friends were entertained by Mr. F. Casson to a substantial tea, spread in pic nic fashion on the grass near

the rhododendron plantation'.⁷⁰ It is, however, likely that Francis eventually gave up horticulture, and disposed of the saleable stock; shortly before he died he attended a 'sale of rhododendrons on the Moors'.⁷¹ In August 1890, the 'plantations, gardens, shrubberies, peat waste land, &c.' were sold.⁷² For six years, nothing further has been detected, but in 1896 a fire swept through the area; its effects were described in the *Doncaster Gazette*:⁷³

The old rhododendron garden, known and visited throughout a long period when owned by the Casson family, was practically destroyed, and the trees and shrubs in the plantations near at hand were in many cases reduced to blackened and charred stumps.

The surviving plants gradually became generally forgotten, remaining known only to those who cut peat in the vicinity, or otherwise knew the moor. A. A. Dallman's published note on Labrador-tea *Ledum palustre* on Thorne Moors⁷⁴ presumably indicates the continuance



FIGURE 4
Rhododendron at Casson's Garden, 1988. The flowers were very pale mauve.
Photo G. Davidson

of a species into the 1930s which was first known from the 1872 stock list. In the mid 1940s, J. F. Verhees, a local naturalist then living in a cottage on the edge of Thorne Moors, first came to know the four reclaimed cable heads. They were not cultivated, and were largely dominated by rough herbage, although there were still signs of former glory. Three white flowered rhododendrons, three or more with red flowers, and a mass with purple, pink and even occasionally mauve-lilac blooms, were still all present. These latter particularly dominated the northern cable head — the original garden site — but also extended a little way southwards at the eastern end of the adjoining cable. Other plants were found which were similarly out of place: a specimen of Chile-pine *Araucaria araucana*, a 'flowering cherry' *Prunus* and 'double flowered' snowdrops *Galanthus*. On the moor beyond the rhododendrons, a patch of Sheep-laurel thrived. These remained until the early 1960s, when all the abandoned area of reclaimed land was turned over to potato growing. Only those species which had spread on to the adjacent peat, or perhaps had been introduced there,

managed to persist, to be rediscovered and documented by naturalists in the post-war years and beyond.⁷⁵

Today, rhododendrons still overshadow this peripheral area of the moorland.⁷⁶ In one spot, the Sheep-laurel is very locally co-dominant with rhododendrons and Heather, but is threatened by peat winning. A single specimen growing elsewhere on the moors has now been destroyed. Along the drain demarcating the edge of the peat from the adjoining fields, a rediscovery of the 1980s — Springbeauty — still endures. It was not, however, planted deliberately, having originally been accidentally introduced with rhododendrons.⁷⁷ These latter are always superficially characterised as being *R. ponticum*, which many of them either are or resemble. However, in the nineteenth century, hybrid scions were often grafted on to stock of the species, which then gradually took over, so that many existing thickets of *R. ponticum* actually originated as hybrid plantings. This was at least partially true at Thorne, though an examination of the flowering rhododendron plants in 1989/90 demonstrated obvious diversity. Although the distinctly red and white bushes were cleared in preparation for potatoes many years ago, the peatland survivors still collectively exhibit a relatively long flowering season, and include specimens whose racemes are as variant as pale pink and deep purple. They display a similar medley of more general morphological characters, a number of the plants having particularly deeply and narrowly lobed corollas. Self-sowing will have widened the range of variation, and it may no longer be possible to match the Thorne examples with any extant hardy hybrids originating from the last century.

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29. *Naturalist* 114: 21–22.
30. *Naturalist* 112: 117–124.
31. *Naturalist* 9: 137.
32. Minute book of Thorne Preparative Meeting 1814–25, held by Sheffield Archives, Sheffield Libraries & Information Services, referenced QR 23; Hatfield (1866); *Naturalist* 112: 117–124.
33. The link is provided by an 1847 indenture, ref. QR 123, held by Sheffield Archives.
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35. Ordnance Survey 6" scale County Series Yorkshire sheet 266; surveyed 1849–52, published 1853.
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43. *Bot. Ser. Trans Y.N.U.*, Vol. 2.
44. *Naturalist* 45: 301–304, 353–356, 381–384; 46: 21–25.
45. Casson (1842); *Naturalist* 9: 137.

46. Limbert, M., Some Notes on the Landscape History of Thorne Moors, in *Thorne Moors Papers* (ed. Limbert, M.); Doncaster, 1987.
47. Casson (1869).
48. The Archives Dept, Doncaster Library & Information Services, has a volume (referenced DY. WALL 3) entitled *Apportionment of the Rent Charge in lieu of Tithes in the parish of Thorne in the West Riding of the County of York*. It is a copy of an original dated August 1840. The accompanying map (DY. WALL 1), showing the numbered parcels of charged land in the parish, is also a copy. These documents note that the Clap Gate farm and cable comprised parcel numbers 1370 (the section east of Thorne Waste Drain) to 1380 (Clap Gate Farm itself). The Casson ownership of 50 acres of 'unproductive moor' presumably comprised the extrapolation of the cable width across the peat to the parish boundary. All 'cable' owners maintained the right to extend their strip holdings across the moorland to the edge of Thorne parish.
49. Casson (1842).
50. Tomlinson, J., *The Level of Hatfield Chase and Parts Adjacent*. Doncaster, 1882. Here it was observed: 'On Thorne Moors there was a garden belonging to a clever and genial Quaker. As a rule Quakers have not the character of being genial; but so William Casson was, in the best sense of the term ... That Thorne people might delight themselves in beauty, he planted a garden on the edge of these moors'.
51. Archives Dept, Doncaster Library & Information Services; ref. PR. FISH 1/5/6.
52. *Naturalist* 20: 159–171.
53. Any rustic furniture was probably crafted by William himself. His obituary in the *Annual monitor for 1887* ... 45 (new ser.): 47–56, noted that: 'when tired of reading or of writing he would turn "for rest", as he said, to his little workshop, where he made wonderful little brackets and frames, stools and tables, on which he painted leaves and flowers. He made stools and frames for the children in a neighbouring Orphan's Home; and little mementoes of his skill are now treasured in many homes up and down the country'.
54. Ballinger, J., John Tomlinson, J. P., Antiquary, in *Old Yorkshire* (ed. Smith, W.). Vol. 3, new ser. London, 1891.
55. Tomlinson (1882).
56. *Doncaster, Nottingham & Lincoln Gazette, Doncaster Chronicle*, 18 January 1878.
57. *Doncaster, Nottingham & Lincoln Gazette*, 18 January 1878.
58. The term 'American plants' had a specific meaning. *The Garden* 10: 27–29 explains: 'In England, after 1809, R[hododendron] catawbiense which in flowers does not differ materially from R. ponticum, soon became, like the latter, extremely common. Concurrently with the acquisition of the American Rhododendrons, there were discovered, chiefly in company with them, many species of the beautiful genera Ledum, Andromeda, Kalmia, and Gaultheria, and of the section of Rhododendron, which, being originally distinguished as a genus under the name of Azalea, still possesses that name in everyday converse. All were conveyed to England, where they immediately became popular, and gave quite a new complexion to the flower garden. For a very long period it was customary to grow these various shrubs in borders by themselves; they demanded similar soil, and bloomed mostly at the same season of the year. Hence they acquired, very naturally, the collective name of American plants, a term still [1876] in use'.
59. A *List and Description of Rhododendrons etc., on sale by W. & J. C. Casson, Thorne*. Thorne, 1872.
60. As checked against Salley, H. E. and Greer, H. E., *Rhododendron Hybrids. A Guide To Their Origins*. London, 1986.
61. Hogg (1874).
62. *Doncaster Chronicle*, 18 January 1878.
63. The presence of Mordecai Casson in Pennsylvania may have been helpful in organising exportation.
64. See William Casson's will (note 3).

65. At the 1871 population census, Francis was detailed as a member of William's household, being listed as a grocer's assistant and presumably then undertaking his apprenticeship. In William Casson's will, dated 1880, it was stated that Francis was then employed as a grocer and seedsman, having perhaps succeeded his uncle on the latter's retirement. Francis was included as a grocer in the 1881 population census, and was listed (1888 data) as a grocer and seed dealer in *Kelly's Directory of the West Riding of Yorkshire 1889*. London, 1888.
66. *Doncaster Gazette, Doncaster Chronicle, Goole Weekly Times*, 4 January 1889.
67. *Naturalist* 7: 22–24; *Nat. Hist. J.* 12: 157–158.
68. *1891 Select List of Vegetable & Flower Seeds Offered for Sale by A. T. Baker (late F. Casson), Seedsman, Thorne*. Thorne, 1891.
69. *Doncaster Chronicle*, 4 January 1889.
70. *Doncaster Gazette*, 21 August 1885.
71. *Doncaster Chronicle*, 4 January 1889.
72. *Doncaster Gazette, Goole Weekly Times*, 15 August 1890.
73. *Doncaster Gazette*, 15 May 1896.
74. *NWNat.* 10: 45–47.
75. The history of this rediscovery is outlined in Limbert (1987).
76. Although the Casson's Garden area remains the centre of rhododendron distribution on Thorne Moors, stunted bushes may be found scattered over the rest of the surface, although mainly on the western half. The exception to this is the area of planted rhododendrons on the moor beyond Whaley Balk/Bell's Pond, close to what was formerly known as Durham's Gardens, with which they were once doubtless connected. This site belonged to Makin Durham of Thorne Hall, and is alleged to have been laid out by the gardener and architect Sir Joseph Paxton, who died in 1865 (Limbert 1987). These rhododendrons all appear to be *R. ponticum*, and have none of the morphological variety of those further south. It is not known whether they were supplied from Casson land, or had an entirely independent origin. Clearly, however, it cannot be assumed that all surviving rhododendrons on Thorne Moors have been derived from the Casson plantings.
77. *Nat. Hist. J.* 12: 157–158; Goole Moor to Crowle, Saturday, in *Y.N.U./L.N.U. Excursion Circular: Goole Moor, Broughton Woods and Twigmoor Gullery. Trans Hull Sc. Fld Nat. Cl.* 1: 1–9.

BOOK REVIEWS

The Botanist in Berwickshire by Michael E. Braithwaite and David G. Long. Pp. vi + 111. Berwickshire Naturalists Club. 1990. £5.30 including postage, available from: M. E. Braithwaite, Clarilaw, Hawick TD9 8PT.

An important contribution, the result of 40 years work initiated by Dr Albert Long, for a county with a long tradition of botanical exploration dating back to the pioneer work of George Johnston (1797–1855) and continued over more than 150 years through the Berwickshire Naturalists Club. The present work provides succinct accounts of these origins and of the county's ecology in terms of present-day habitats available for flowering plants, ferns, mosses and liverworts, followed by lists of these groups showing status (and localities for less common species) and preferred substrata, habitats, etc. The flora currently consists of 722 species of flowering plants and ferns and 426 species of bryophytes; 88 species of flowering plants and ferns are thought to have become extinct since 1830. A bibliography, indexes to genera and families, and a gazetteer are also provided.

Scandal in Madeira by Roy Nash. Pp. 187. The Book Guild, Lewes, Sussex. 1990. £10.50.

Richard Thomas Lowe (1802–1874) spent much of his adult life studying the natural history of Madeira, and to a lesser extent, that of the Cap Verde islands and the Canaries. He is especially remembered for his *A Manual of the Flora of Madeira ... &c.* that appeared in parts from 1857 to 1872, and was unfortunately not quite complete at his death. Another major work was *A History of the fishes of Madeira* that also appeared in parts, from 1843 to 1860. In addition to making large collections (his plants are at Kew, and his shells and fishes at The Natural History Museum, London), he published a number of papers on various aspects of his researches.

He first went to Madeira to arrange a prolonged stay there for his mother for the good of her health. There was a flourishing British community at Funchal, comprising merchants, especially those concerned with the wine trade, and invalids hoping to benefit from the climate. They had their own church, in the charge of a chaplain appointed by the British Foreign Secretary. As were many 19th century naturalists, Lowe was in holy orders, and when the chaplaincy became vacant in 1833 he was appointed to it. Immediately he set about making changes in line with the 'Tractarian Movement'. Lowe's congregation objected to changes in the services and other alterations that he introduced without consultation. Lowe would not discuss matters with the Funchal church council, and they appealed to higher authority. He had chosen to oppose the wrong man in Palmerston, the Foreign Secretary, who understood power; Lowe was dismissed in 1848, and a successor appointed. He continued to preach to a rump of the congregation that supported him in a room off an alley in the town, but gave this up in 1851. These disputes in the Funchal church, lasting nearly thirty years, are the 'Scandal' referred to in the title of this book, which has to be regarded as literary journalism rather than as history; furthermore, the book contains little of interest to the naturalist.

Through the influence of his wife (whom he had married in 1843), Lowe was appointed to a living at Lea in Lincolnshire. He was no more successful there than he had been in Madeira, but he continued to travel to the Atlantic islands, and as indicated above, published useful work on their natural history.

FHB

Birds in Focus by Mark Carwardine. Pp. 160, with over 200 colour photographs, Salamander Books. 1990. £16.95.

Birds in Focus is without question a book for the coffee table. Seven aspects of bird behaviour are illustrated by more than 200 superb photographs of birds from throughout the world. Most of the photographs have been cleverly chosen and arranged in complementary pairs or groups, with just sufficient text added to provide interest without being overpowering to the non-ornithologist. Although the book will appeal to the ornithologist because of the sheer beauty of the pictures, it is probably aimed more at the bird lover rather than the dedicated bird watcher. The text gives a thumb-nail sketch of the behaviour or character of the birds depicted; much of this information will be familiar to anyone with the slightest knowledge of birds but may be of interest to the layman. The book, if not aimed specifically at the uninitiated, will certainly be read by them and therefore should explain that the Great Black-backed Gull illustrated is a first year immature which will eventually have a black back and look more like the well known seagull; however this is a minor criticism of an otherwise well written text.

The photographs, which have been taken by some of the world's leading photographers, should inspire all bird and wildlife photographers and the publishers are to be congratulated on the quality of the reproduction. This book will make an ideal Christmas present for potential bird watchers or conservationists. Left on the coffee table, it cannot fail to impress and might perhaps convert some visitors to become bird enthusiasts.

JEK

LICHEN FLORA OF THE WEST YORKSHIRE CONURBATION SUPPLEMENT IV (1984–90)

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The recolonization of the ameliorating environment of the West Yorkshire conurbation by lichens continues unabated: the appreciable reductions in air pollution in general, and sulphur dioxide in particular, over most of the study area have been conducive to lichen re-establishment on a wide variety of substrata. Of particular interest in this respect is the spread of foliose lichens such as *Hypogymnia physodes*, *Parmelia* spp. and *Physcia* spp., but it should be noted that the success of some foliose species, notably *Xanthoria parietina*, *X. polycarpa* and *Phaeophyscia orbicularis*, in reinvading local urban environments is due in part to a rise in nutrient enrichment (mainly nitrogen and phosphorus) from a variety of artificial (agrochemicals, dusts) and natural (bird excreta) sources; fruticose species, such as *Ramalina farinacea* and *Evernia prunastri*, have recolonized in several areas of the conurbation, but have so far failed to establish themselves successfully.

The above observations support previous findings in respect of the West Yorkshire conurbation (Seaward 1979, 1981; Henderson-Sellers & Seaward 1979). Decline in the lichen floras of many urban areas over the past two centuries has been halted and major improvements recorded in numerous other European cities, eg. London (Rose & Hawksworth 1981; Hawksworth & McManus 1989), Munich (Kandler & Poelt 1984) and Paris (Seaward & Letrouit-Galinou 1991); quantitative reductions and qualitative differences in air pollution resulting from changes in national energy policies and industrial practices, economic factors and implementation of clean air legislation have been instrumental in encouraging the return of lichens.

Anthropogenic saxicolous substrata are also conducive to lichen establishment in urban areas, and some previously inhospitable under polluted conditions are now proving favourable to lichen growth; *Lecanora muralis*, for example, is now found within 3 km of the centre of Leeds on tarmacadam (cf. Seaward 1976, Table VI). To date, 210 saxicolous species (entirely or partly so) have been reported from the conurbation, of which 154 have been recorded during the recent survey (October 1967–December 1990).

The establishment of lichens on lignum is less evident in urban environments, but where nutrient enrichment occurs, eg. decorticated tree trunks in suburbia, a diverse and colourful flora (*Candelariella vitellina*, *Lecanora dispersa*, *Phaeophyscia orbicularis*, *Rinodina gennarii*, *Xanthoria parietina*, etc.) is to be found.

The generally improved status of lichens throughout the conurbation over the past 18 years is clearly demonstrated in Figure 1, which has been constructed from multidirectional transect work to distances of c. 18 km from the centre of the conurbation (grid ref. 44/200,300). All zones, even those in central urban areas, show impressive species gains, a clear confirmation of the value of lichens in monitoring falling air pollution levels as well as of their more familiar role as bioindicators of stable and rising levels.

The following list of lichens includes additions to the flora together with changes in status and distribution of other taxa over the past seven years based on recording units given in Seaward (1978, Figure 1 and Table 1). As a consequence of this work, the lichen flora of the West Yorkshire conurbation can be summarized as follows: 337 lichen taxa have been reported from the area within 20 km of the centre of the conurbation, of which 5 are doubtful in the absence of supporting herbarium material, at least 33 are extinct in the area, and 199 have been recorded during the present survey (October 1967–December 1990).

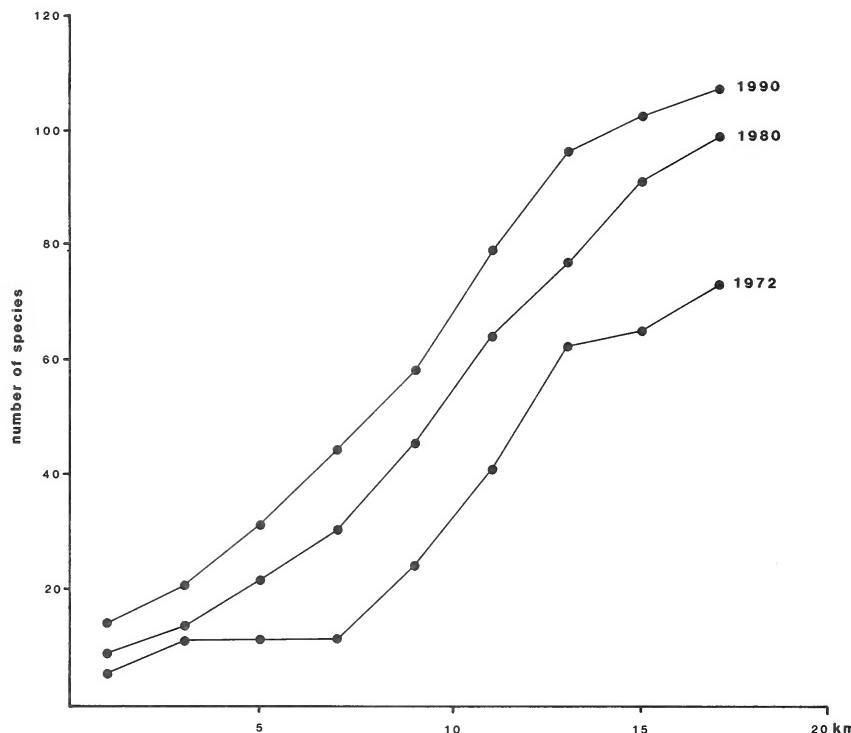


FIGURE 1

Relationship between lichen diversity and distance from the centre of the West Yorkshire conurbation in 1972, 1980 and 1990

We are grateful to Mr P. M. Earland-Bennett, Dr O. L. Gilbert and Dr D. J. Hackett for their field records, and to Dr B. J. Coppins for his identification of the more critical material.

Acarospora fuscata (Nyl.) Arnold Add D.

A. macrospora (Hepp) Bagle. V (Earland-Bennett, 1976, on 'black-lime' mortar of Millstone Grit wall coping, 44/071.198). New to the conurbation.

A. umbilicata Bagl. U (Henderson, 1984, on Millstone Grit roadside wall); see Henderson (1986). New to the conurbation.

Arthonia leucodontis (Poelt & Dobb.) Coppins M (Henderson, 1981, on sandstone wall face, 44/288.360); see Coppins (1989). Delete *A. cf. exilis* in Seaward and Henderson (1984).

Bacidia saxenii Erichsen M (Henderson, 1988, on iron railings, Meanwood Tannery, 44/283.371). New to the conurbation.

Buellia punctata (Hoffm.) Massal. Add M (on *Salix* and *Fagus*).

Caloplaca citrina (Hoffm.) Th.Fr. Add S.

C. holocarpa (Hoffm.) Wade Add D, S.

C. saxicola (Hoffm.) Nordin (= *C. murorum* (Ach.) Th.Fr.) Add M.

- Candelariella vitellina* (Hoffm.) Müll. Arg. forma *flavovirella* (Nyl.) Henderson Distinctive citrine-green form known only from one site within the conurbation. M (Henderson, 1985, sandstone wall coping of bridge near Adel Mill Farm, 44/275.407).
- Catillaria lenticularis* (Ach.) Th. Fr. U (Gilbert & Henderson, 1986, on Millstone Grit roadside wall, 44/208.447). New to the conurbation.
- Chrysothrix candelaris* (L.) Laundon Add (V); record in Hobkirk (1868) as *Lepraria flava*. New to the conurbation.
- Cladonia chlorophcea* (Flörke ex Sommerf.) Sprengel Add D.
- Collema tenax* (Swartz) Ach. var. *ceranoides* (Borrer) Degel. Add P (on demolition site).
- Dimerella diluta* (Pers.) Trevisan M (Henderson, 1984, on *Fraxinus* in roadside banking, 44/279.403). New to the conurbation.
- Evernia prunastri* (L.) Ach. Add A (on base of *Salix*, 44/07.42).
- Gyalideopsis anastomosans* P. James & Vezda U (Gilbert, 1988, on *Acer* and *Salix*, 44/273.412). New to the conurbation.
- Haematomma ochroleucum* (Necker) Laundon var. *porphyrium* (Pers.) Laundon Add T.
- Hypogymnia physodes* (L.) Nyl. Delete (A), add A. Spreading into the conurbation, often on *Salix*.
- Lecania erysibe* (Ach.) Mudd Add S.
- Lecanora albescens* (Hoffm.) Branth & Rostrup Delete (T), add T.
- L. dispersa* agg. Spreading on *Acer*, *Salix* and decorticate wood.
- L. muralis* (Schreber) Rabenh. Spreading on a variety of substrata (mainly calcareous), including lignum and tree bases.
- L. polytropa* (Hoffm.) Rabenh. Add D.
- Lecidea fuscoatra* (L.) Ach. Add U (on terrace sandstone, Harewood House).
- Lepraria neglecta* auct. Add T.
- L. zonata* Brodo Add U.
- Micarea botryoides* (Nyl.) Coppins Add B. Fruitless plants with black-stalked pycnidia referred to under *M. melaena* (Nyl.) Hedl. in Seaward and Henderson (1984) are in fact *M. botryoides*.
- Opegrapha atra* Pers. Add (V); record in Hobkirk (1868).
- O. saxatilis* agg. Add (V); record in Hobkirk (1868). New to the conurbation.
- Parmelia subaurifera* Nyl. Add T. Small thalli at other sites difficult to separate from *P. glabratula* (Lamy) Nyl. Both species often overlooked on damp tree bark.
- P. sulcata* Taylor Add A (on *Salix*). Small thalli at several sites difficult to separate from *P. saxatilis* (L.) Ach.
- Physcia adscendens* (Fr.) H. Olivier Add S.
- P. caesia* (Hoffm.) Fürnrohr Add S.
- Placynthiella icmalea* (Ach.) Coppins & P. James D, T (Seaward, 1985, cut surface of tree stumps). New to the conurbation.
- Porina chlorotica* (Ach.) Müll. Arg. U (Henderson & Hackett, 1985, on sandstone wall below coping, 44/306.447). New to the conurbation.
- Rinodina gennarii* Bagl. Add P, S.
- Scoliciosporum chlorococcum* (Graewe ex Stenhammar) Vezda Add A, D.
- Thelidium mesotropum* (Nyl.) A. L. Sm. Add P (on demolition site).
- Thelocarpon laureri* (Flotow) Nyl. P (Gilbert, 1988, on demolition site, 44/31.34). New to the conurbation.
- Toninia aromatica* (Turner ex Sm.) Massal. Add T.
- Trapelia coarctata* (Sm.) Choisy Add P.
- T. placodioides* Coppins & P. James T (Seaward, 1986, on smooth siliceous stones). New to the conurbation.
- Trapeliopsis granulosa* (Hoffm.) Lumbsch (= *Lecidea granulosa* (Hoffm.) Ach.) Add D.
- T. pseudogranulosa* Coppins & P. James T,U (Seaward, 1985, peaty soil and decaying plant debris). New to the conurbation.
- Verrucaria baldensis* Massal. Add T.

- V. bryoictona* (Th. Fr.) Orange (= *V. melaenella* p.p. non Vainio) P (Gilbert, 1988, on demolition site, 44/31.34). New to the conurbation.
- Xanthoria parietina* (L.) Th. Fr. Add I.
- X. polycarpa* (Hoffm.) Rieber M, U, V (Seaward, 1985, on *Salix*, *Fagus*, *Fraxinus*, rubber-compound dustbin lid, etc.). Spreading into suburbia. New to the conurbation.

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A FURTHER STUDY OF THE MOSS MITES OF THE LAKE DISTRICT (ACARI: ORIBATIDA)

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INTRODUCTION

The moss mites of the high ground of the Lake District, Cumbria, are known only from a collection made by Ms J. Fuller in 1962 from Burtness Combe (Seyd 1966). Her collections consisted of three samples: moss, lichens and heath litter. Collections made by one of the authors (ELS) in 1967 from two other Lake District Peaks, Harrison's Stickle and Pike of Blisco, are the subject of the present study and they add further to our knowledge of high upland species.

Burtness Combe, where Ms Fuller collected, is a vast hollow overlooking Buttermere from the south-west and lying between the peaks High Crag and High Stile. The southern edge of the Combe forms a 730m ridge connecting these two peaks and it was at this altitude that the Fuller collection was made.

Harrison's Stickle (732 m), 13 km south-east of Burtness Combe, is the second highest peak of the Langdale Pikes, which lie due west of Grasmere. About 3.5 km south-west of Harrison's Stickle is Pike of Blisco (702 m), which is one of the Bowfell group of mountains.

MATERIALS AND METHODS

Two samples were collected on Harrison's Stickle, one a mixture of moss and lichens from the summit and the other drenched moss from the edge of a waterfall about 60 km below the summit. Two samples were also collected on the summit of the Pike of Blisco. One was again a mixture of moss and lichens and the other of moss alone.

The samples were brought back to the laboratory in plastic bags and the mites were extracted in the usual way by means of a Tullgren funnel.

SPECIES LIST

In the following list the samples in which each of the listed species was present are indicated by the following notation.

Harrison's Stickle: moss/lichen HSML Pike of Blisco: moss/lichen PBML

Harrison's Stickle: waterfall/moss HSWM Pike of Blisco: moss PBM

In order to give a measure of the relative abundance of the different species, the number of specimens of each species in the samples is shown in brackets.

The classification and taxonomy used below follows that of Luxton (in prep.) and Marshall *et al.* (1987).

Family CAMISIIDAE Oudemans, 1900

Camisia horrida (Hermann, 1804). HSML (1), PBML (7). Burtness Combe in moss.
An Holarctic species, widely distributed in Britain.

Camisia invenusta (Michael, 1888). HSML (1), PBML (6). Burntess Combe in litter.

Recorded from upper moorland and mountain peaks in Britain (Seyd 1966, 1968, 1981; Wood 1967) and from high ground in the Swiss Alps (Schweizer 1922), Pyrenees (Travé, 1960 1963) and Northern India (Colloff, unpublished). There are, however, a few records from

lowland sites in the British Isles (Michael 1888; Halbert 1915, 1920; Hull 1916; Colloff 1983; Pugh & King 1988).

Seyd and Seaward (1984) place this species in their lichen-associated group B species. These are species which preferlichens as a habitat and feeding source but which are also found on other plants. Colloff (1983) recorded it from the maritime lichen, *Anaptychia runcinata* [= *A. fuscata*], on the Island of Great Cumbrae. British Isles, Europe, Scandanavia, Faroes, Soviet Union, India.

Platynothrus peltifer (C. L. Koch, 1840). HSML (4), PBM (5). Cosmopolitan. Common and widely distributed.

Platynothrus punctatus (L. Koch, 1879) (*Heminothrus valentianus* Hull, 1916). HSWM (3).

This is only the fifth record of this arctic and subarctic species from Britain. The first was from Kinder Scout, Derbyshire, at 610 m (Seyd 1958), the second from the Moor House National Nature Reserve, Cumbria at 549 m (Block 1965) and the third from the Cheviot at 808 m (Seyd 1988). A fourth record is that of Hull (1916) also from the Cheviot, though Hull described it as a new species, *Heminothrus valentianus* (see Seyd 1970).

Like *Platynothrus fluvialis* (Hull 1913), *P. punctatus* is often aquatic or is found in damp habitats. Thus Sellnick and Forsslund (1955) also found it in moss in slow-flowing water, in springs and brooks and on the shore of lakes. Strenzke (1955) also found it in the middle of a brook and in very damp moss at the edge of a lake. One of Karppinen's records of the species (Karppinen 1971) was from a bog beside a pond. Schweizer (1956) collected it from moss at a spring, Hammer (1944) from the edges of lakes and in bogs, Willmann (1943) from springs and Trägårdh (1910) from moss in slow-flowing water. Graverson (1931) even reports the species being found in the stomachs of sticklebacks taken from a small pond!

It has frequently been recorded from less aquatic habitats, for example from a wet meadow (Solhøy, pers. comm.), often with *Platynothrus peltifer*, but of the two species *P. punctatus* is more abundant in the wetter sites. Dalenius (1960), who collected both species from ten different habitats, found that while *P. peltifer* was more abundant than *P. punctatus* in the majority of habitats, the situation was reversed as the sites became wetter and in bogs and fens there were high densities of *P. punctatus*.

Novaja Zemlya, Baren Island, Siberia, Jan Mayen Island, Svalbard, Sweden, Norway, Finland, Iceland, Greenland, Canada, Alaska, mountains of Britain and Switzerland. References to its synonymy and distribution are given by Seyd (1970) and Marshall *et al.* (1987).

The view that in its southern range *P. punctatus* is an arctic relict species has been advanced by Seyd (1962) and by Hammer and Wallwork (1979).

Family CARABODIDAE C. L. Koch, 1837

Carabodes marginatus (Michael, 1884). HSML (3), PBML (2). Burtness Comb in litter. Palaearctic. Common and widely distributed.

Family TECTOCEPHEIDAE Grandjean, 1954

Tectocepheus velatus (Michael, 1880). HSML (6). Burtness Combe in litter. Cosmopolitan. Common and widely distributed.

Family HYDROZETIDAE Grandjean, 1954

Hydrozetes lacustris (Michael, 1882). HSWM (20). Holarctic. Common in damp habitats, especially freshwater streams and ponds in *Sphagnum*, moss and weeds.

This would appear to be only the second record of this species at a high altitude in Britain Block (1965) having recorded it from the Moor House National Nature Reserve at 549 m.

Family LIMNOZETIDAE Grandjean, 1954

Limnozetes ciliatus (Schrank, 1803). HSWM (600), HSML (1).

Palaearctic and Canada, recently recorded from bog pools in New Brunswick — the first Nearctic record (Behan-Pelletier 1989). Damp or very wet habitats, especially in

Sphagnum. *L. ciliatus* has not been recorded very often in Britain and two of these records have been from high ground in the Moor House National Nature Reserve (Block 1965) and on Kinder Scout (Seyd 1962), in both cases recorded as *L. sphagni* (Michael).

Family CERATOPPIIDAE Kunst, 1971

Ceratoppia bipilis (Hermann, 1804). PBML (2). Burtness Combe in litter.

Holarctic. This species has been recorded many times in Britain, mostly in moss and litter. It does not appear in the list of Seyd and Seaward (1984) of oribatids associated with lichens but Colloff (1983) collected five specimens from *Cladonia portentosa* on the Island of Great Cumbrae.

Family OPPIIDAE (C. L. Koch, 1840)

Dissorrhina ornata (Oudemans, 1900). HSML (29), PBML (7), PBM (3). Burtness Combe in litter. Holarctic. Common and widely distributed.

Moritzoppia sp. nov. HSML (1), PBM (2). Burtness Combe in litter (recorded as '*Oppia* sp.')

This species is close to *Moritzoppia clavigera* (Hammer 1952) but has five pairs of genital setae rather than four pairs, only one solenidion on tarsus II rather than two, and the alveoli of setae *le* are situated some distance anterior of the anterior apices of the costulae, rather than in close proximity to them. The description of this species is the subject of another publication (Colloff & Seyd, 1991).

Family SUCTOBELBIDAE Grandjean, 1954

Suctobelba trigona (Michael, 1888). HSML (2).

Palaearctic. This is another species for which there are only a few records from Britain and two of them are from upper moorland, Block (1965) having recorded it from the Moor House National Nature Reserve and Wood (1967) from near Malham Tarn, North Yorkshire. There is also a record from Ireland (Halbert 1915) at 183 m.

Family BANKSINOMIDAE Kunst, 1971

Banksinoma lanceolata (Michael, 1885). HSML (23), PBML (4), PBM (1). Burtness Combe in litter. Palaearctic. Common and widely distributed.

Family CERATOZETIDAE Jacot, 1925

Edwardzetes edwardsi (Nicolet, 1855). HSML (15). Holarctic (not North America). Common and widely distributed.

Family CHAMOBATIDAE Grandjean, 1954

Chamobates scheutzi (Oudemans, 1902). HSML (1), PBML (3). Burtness Combe in lichens, litter.

Holarctic. Recorded from several montane and upland moorland sites in Britain (Seyd 1962, 1966, 1968, 1981, 1988; Block 1965; Usher 1975) but also known from lowland moorland sites in southwest England (Webb 1972; Luxton 1990).

Family MYCOBATIDAE Grandjean, 1954

Mycobates sarekensis (Trägårdh, 1910) (*Calyptozetes sarekensis* (Trägårdh, 1910)). HSML (38), PBML (10). Burtness Combe in lichens, litter.

Arctic and Subarctic zones of the Holarctic region, mountains of Britain and southern Europe. An arctic relict species in these southern regions (Seyd 1979; Hammer & Wallwork 1979). A member of group B of the list of lichen-associated Oribatida (Seyd & Seaward 1984).

Family ORIBATULIDAE Thor, 1929

Zygoribatula exilis (Nicolet, 1855). HSML (27), PBML (10), PBM (3). Burtness Combe in lichens. Holarctic. Generally distributed.

DISCUSSION

An analysis of the faunal list shows that 16 species of Oribatida were recorded from Harrison's Stickle and 11 from Pike of Blisco. Reference to the paper on the Oribatida of Burtness Combe shows that the faunal list of that peak consists of 16 species. If we now make a combined list of 22 species in all from the three sites, we find that 9 of the 22 species are

present at all three sites, 3 are found at two of them and 10 are present on only one of the peaks.

However, a closer inspection of these 10 species, 5 from Harrison's Stickle (3 of them in the waterfall moss) and 5 from Burtness Comb, shows that every one of them appears on one or more of the faunal lists of Oribatida from other montane sites in England and Wales, which have been the subject of study over the last thirty years. Moreover this applies equally to the 12 species found on either two or all three sites of the Lake District Peaks.

The present study therefore is further evidence that the oribatid montane fauna of Britain is characterised by a common group of oribatid species. It has been suggested that a possible explanation for this fact is that these are cold-adapted species (Seyd 1988). As pointed out in that study, it would appear to be quite reasonable to make such an assumption for species such as *Mycobates sarekensis* and *Platynothrus punctatus*, which are species restricted to mountain summits in Britain, but much more difficult to believe that this also applies to the majority of species in the group, since they are also common at low altitude. However Colloff (see Seyd 1988) has made the point that it could well be true that such species over a period of time have become differentiated into both high and low altitude populations, which differ in their cold adaptive tolerance.

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BOOK REVIEWS

Natural Landscapes of Britain from the Air, edited by N. Stephens. Pp. 288, with 146 b/w photographs + 101 line drawings depicting geological sections and maps. Cambridge University Press. 1990. £19.50.

This lavishly illustrated book uses aerial photographs to illustrate notable landscapes and landforms in Great Britain. The clarity of the black and white photographs is often exemplary

and many well known features of Northern England, such as Giggleswick Scar, Malham Cove, Curbar Edge, Newtondale, Borrowdale and the Great Whin Sill, as well as equally cherished landforms of Scotland, Wales and central and southern England, are presented. Many of the photographs are accompanied by explanatory maps and geological sections and all are dealt with in the text, which has been written by expert geographers and geologists. A particularly welcome feature is that grid references are provided for all of the photographs.

Though the work is not a textbook on geomorphology, it would be of considerable value to students studying physical geography or geology. The work is divided into seven chapters, each written by an academic authority. The first chapter illustrates the effects of rock types and geological structure on landforms and the others are concerned with the result of processes which have shaped the land. The themes covered are landforms created by glacial erosion and meltwater, glacial deposits, periglacial activity, fluvial processes, coastal processes, and a final chapter covering miscellaneous activity such as landslips, man-induced erosion, storm surge damage and quarrying.

The examples are well chosen and the text clearly explains how landforms have evolved and what processes are still shaping them. Though the authors have occasionally digressed from a straight account of the types of landform which are illustrated, this may be considered to add to the interest of the volume and the additional information may well appeal to readers who are interested in the evolution of the landscapes of Britain. The text is supported by a concise but well chosen set of references, which should serve to enable readers to effectively pursue their interests. In short, the volume is a worthy addition to the growing number of books depicting British landscapes, and has both sound academic qualities as well as a more popular appeal.

DEC

Britain's Changing Environment from the Air, edited by T. Bayliss-Smith and S. Owens. Pp. 256, with 142 b/w photographs + 18 b/w illustrations. Cambridge University Press 1990, £25.

This volume clearly attempts to draw upon the strengths of the superb aerial photograph collection of the Cambridge University Committee for Aerial Photography to produce a semi-popular volume detailing the changes which have occurred within the landscape of Britain. There are eight chapters, each written by experts who seek to describe in detail 'the destruction of lowland woods and hedgerows, heather and wetlands, watercourses and ancient grasslands ... the effects of industrial expansion, dereliction, changing energy requirements [and] the immense and rising impact of cars and road transport on working, housing and shopping patterns, travel and leisure'.

The photographs within the volume are a delight: crisp, clear and packed with information. Each has a caption explaining the salient features, but unfortunately all too frequently the photographs are not integrated effectively with the main text, and on some occasions (as on page 174 when reference is made to photographs of Dover in a discussion of the privatisation of British Airways) things are clearly amiss. None of the photographs are accompanied by grid references, and the 16 splendid photographs used in the final chapter can only be located by rummaging into the Appendices to determine their provenance.

Though the text is clear and authoritative, a couple of major bungles occur in the description of the Loch Rannoch area on page 24, where it is claimed that the area is 'dominated by one of three native conifers *Pinus sylvatica* (sic) (the others are gorse and juniper)'!!!

Taken individually, some of the chapters are excellent, and yet the volume does not seem to cohere. It may be that political and economic forces do not lend themselves to being interpreted by aerial photography! It is also difficult to determine the book's probable market. Academically it covers a wide range of topics but not ones which are usually integrated. The themes of the changing countryside are admirably covered elsewhere, for example by J. Blunden and N. Curry (1985), *The Changing Countryside* (Croom Helm) and the abundance of Latin botanical names in some chapters will probably deter the lay purchaser, especially as the volume is not particularly cheap.

DEC

**A REVIEW OF THE SMELT (*OSMERUS EPERLANUS L.*)
IN THE HUMBER AND TEES ESTUARIES, THEIR TIDAL TRIBUTARIES
AND THE TIDAL WATERS OF LINCOLNSHIRE**

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INTRODUCTION

The smelt or sparling *Osmerus eperlanus L.*, is a surface feeding, shoaling fish of inshore and estuarine waters, preying on planktonic crustaceans and fish fry. Its distribution extends from the shores and estuaries of the White Sea, the Baltic region, the British Isles and the continental coast from Denmark to the Bay of Biscay (Muus & Dahlstrom 1971, Wheeler 1978). Isolated land-locked populations, relicts of migratory stocks of the early post-glacial period, were known in lakes across Scandinavia and European USSR (Wheeler 1978). Many of these waters are now fishless through the effects of pollution and Britain's only freshwater post-glacial relict population, in Rostherne Mere, Cheshire, became extinct in the 1920s (Wheeler 1978, Cacutt 1979).

In Britain up to the 19th century smelt populations were present in prodigious abundance in the tidal reaches of all large river systems south of the Tay and Clyde (Yarrell 1836, Regan 1911); indeed, descriptions of the River Forth at Stirling Bridge being periodically yellow with smelt eggs (Regan 1911) and up to two thousand fishermen taking smelt in the Thames between London Bridge and Greenwich (Cacutt 1979) are now part of fishing folklore. Significantly, smelt have not been recorded in the Firth of Forth since the early 1970s and the only remaining smelt spawning grounds are thought to be confined to four or five Scottish and English estuaries (Maitland 1989).

This study shows that commercially exploitable stocks in the Tees, Humber, Trent and Ouse collapsed during the late 19th and early 20th centuries and subsequent records indicate the survival of no more than token populations; indeed, Maitland (1989) warns that the smelt is one of twelve species of previously abundant fresh water and estuarine fish now under serious threat of extinction in British waters.

Recent records from the Humber area have prompted the compilation of this historical review, with a view to forming a database for the promotion of the conservation and possibly the commercial management of the smelt in the Humber and its tidal tributaries.

TEES

Smelt were commercially exploited in the Tees estuary during the 16th century, to the extent that in 1530 it was deemed necessary to control this practice, the 'Cursitor's Roll' of 1530 pronouncing that:

'... it is ordered that no man or no sort of the fisher ... shall fish with Kydill netts for taking of smelts, sparlings or fry from a certain place called Salthouse so upwards upon the river Tees after St. Marks day (25th April) unto Lammas day (1st August) only hereafter upon pain of 6s. 8d. of every man so doing.' (Brewster 1796).

Surtees (1823), describing the lower Tees immediately prior to the development of the city of Middlesbrough and the rise of industrial Teesside, noted that the river produces great abundance of excellent fish such as flounders, eels, smelts or sparlings.

By the 1880s it was still resident and common (Clarke & Roebuck 1881) and Grabham (1907) noted that at times it was very common.

Due to its unique cucumber flavour, smelt was much in demand for human consumption. Consequently, various attempts were made to 'farm' land-locked stocks. One such venture was undertaken by Col. Meynell, who kept a stock for four years in a 3-acre freshwater lake adjacent to the Tees at Yarm (NZ/4112). Yarrell (1836) reported that:

'They continued to thrive and propagated abundantly ... When the pond was drawn the fishermen of the Tees considered that they had never seen a finer lot of smelts. There was no loss of flavour or quality'.

HUMBER

Smelt were abundant from the Ouse to Spurn Point (TA/41) (Clarke & Roebuck 1881, Grabham 1907) and during the 19th century the estuary supported several commercial smelt fisheries, those at Ferriby (SE/9825) and Brough (SE/9326) supplying markets as distant as Doncaster (Sheardown 1872). According to Smith (1915) they favoured the brackish water of the Humber and abounded in the Alexandra Docks, Grimsby, where in September specimens reached a fine size. Procter (1922), referring to East Yorkshire waters and probably basing his comments on earlier references, noted that smelt were common during the fall of the year in tidal waters and could be taken in considerable numbers.

After the First World War however, it was noticed that 'The smelt, once a common visitor to the Humber, has disappeared and rarely indeed is caught now' (Smith 1926).

During the 1950s, smelt were found to occur in a number of flooded clay pits along the south bank of the Humber, particularly in Dick Fairfield's Pond (TA/0724) and Pelican Pond (TA/0523) (pers. comm. T. W. Day). These were connected to the estuary by sluices allowing access for flounders and other brackish water species which formed the basis of a thriving winter fishery. Most of these sluices are now blocked, the waters isolated from the estuary and managed purely as 'coarse' fisheries. Interestingly, during the 1890s, in a similar project to the Yarm experiment (Yarrell 1836), smelt were kept, together with herring, flounder and brown trout in a 3-acre flooded clay pit adjacent to the Humber south bank at New Holland (TA/0724) (Foster 1893).

On the Humber north bank smelt and flounders gain access to Melton Waters (SE/9524: 9525), a large productive coarse fishery connected to the estuary by a sluice system (Howes & Kirk 1991). Fishing matches for flounders are regularly held during the winter months and smelt are occasionally caught; indeed, four specimens with a combined weight of 6 oz. were caught and returned to the water alive during a match on 13 October 1985 (T. W. Day pers. comm.).

On 10 June 1984 Mr H. J. Maynard of Doncaster caught a smelt on rod and line near the mouth of the Hedon Haven and Burstwick Drain at Paull (TA/1627). The specimen is in the Doncaster Museum collection. Smelt also occur with flounders and eels in the mouth of Stone Creek or the Keyingham Level Drain (TA/2319) (Howes & Kirk 1991).

OUSE

In reviewing Yorkshire's fish fauna, Meynell (1844) made particular mention of smelt in the Ouse. The irregular stock fluctuations, a characteristic of this species, was commented upon by Denny (1840) who regarded the smelt as occasionally plentiful in the Ouse at Cawood (SE/5737) noting that on 21 December 1834 they were in such abundance that they were sold in Leeds Market at 2d per lb.

During the mid-19th century however, the Howden fisheries declined, the Rev. Thomas Clarke (Anon 1851) claiming that although salmon, trout and smelt were often plentiful, the local fisheries had become nearly valueless. Catch levels in the adjacent fishery at Goole were also probably unexceptional, since Thomas Bunker, that assiduous recorder of Goole fish, in a lecture on the subject given to the Goole Naturalists' Society and reported in the *Goole Weekly Times* (1882) merely refers to the smelt nets catching considerable numbers of flounders.

Smelt from the Ouse fisheries were still being sold at Doncaster fish market, where from 1866 to 1870-1 prices per dozen were 6d; 1/-; 1/3; 1/6; 2/- and 6d to 1/- respectively (Sheardown 1872). Although seasonal abundance was known to fluctuate, these steadily rising prices may be evidence of a downward trend in population; certainly these prices are somewhat higher than the 2d. per lb being charged on Leeds Market during the 'glut' period of December 1834.

Clarke and Roebuck (1881) claimed that smelt abounded in the Ouse up to Naburn Lock (SE/5944), and Grabham (1907) reported that 'In the months of March and April, Mr Tom Smith nets many of these fish just below Naburn Lock (SE/5944), close to York'. Dr E. W. Taylor also recalls that although not present in the Derwent, 'smelts were formerly netted in large numbers up to Naburn (SE/5944)' (Clegg 1977). However, Grabham (1915) noted that 'smelt netting there in April 1914 was a complete failure'.

TRENT

Michael Drayton, in his epic poem *Polyolbion* published in 1622, refers (song 26, stanza 220) to the 'sweet-smelling smelt' occurring in the Trent.

During the 19th century, particularly in its lower reaches and the Isle of Axholme region (SE/80), smelt were noted in the Trent, its connecting tributaries and 'warping' drains (Stonehouse 1839, Peacock 1900). Indeed smelt from the Trent fisheries were sold on Doncaster Market during the 1860s and early 1870s (Sheardown 1872) and in 1915 it was still regarded as plentiful at Torksey (SK/8379) and Lea (SK/8187) (Smith 1915). However, although familiar with Drayton's (1622) poetical allusion, Carr (1906) was not aware of smelt penetrating further up-stream into Nottinghamshire.

A residual population may still enter the lower reaches of the Trent, since specimens were occasionally caught by the Doncaster angler Alf. Kitchen in adjacent stretches of the Chesterfield Canal during the 1950s (Doncaster Museum records) and others were caught during an angling match at Littleborough (SK/8282) in November 1966 (Cacutt 1979).

LINCOLNSHIRE TIDAL WATERS

Yarrell (1836) reported large quantities of smelt taken in spring along the sandy shallow shores of the east coast, particularly Lincolnshire. Within Lincolnshire's Wash and Fenland areas, Brogden (1899) noted that smelt could still be taken in large quantities and recalled helping to net 751 specimens in a deep hole in the Welland in a single haul.

Smith (1915) also referred to smelt occurring along the Lincolnshire shoreline, noting that 'The horse nets near Skegness sometimes each catch a score along with the shrimps'. He also noted their preference for brackish water, occurring in the Wash, Boston Docks, the Witham, Welland and Wainfleet Haven, where large quantities are caught.

CONCLUSIONS

Since it would appear that a residual smelt population still exists in the Humber/Trent system and that given the opportunity, fish seasonally visit accessible estuary-side clay pits and the mouths of fresh water inlets, it would seem desirable as a conservation measure to manage more of these waters as smelt breeding and rearing sites with a view to re-establishing the large and commercially valuable populations which previously occurred.

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BOOK REVIEW

Snowdonia by W. A. Poucher, Pp. 210. Constable. 1990. £15.95.

This book is a collection of 100 colour photographs taken by the late W. A. Poucher in his travels around Snowdonia, and have been collated and annotated by his son John Poucher. The photographs chosen cover the Snowdonia National Parks crags, fells and valleys. The sequence of photographs goes from north from just outside the National Park at Great Orme head to the south at Aberdovey on the edge of Cardigan Bay. Many of the photographs are excellent at depicting the grandeur and beauty of the Snowdonia fells. The photographs are in the same style as the other books compiled by W. A. Poucher of Wales, the Lake District and Scotland. The standard of most of the photographs is on the whole good, but it is clear from some of the strange colours that many of the negatives or transparencies are on the old side. The composition of one or two photographs is poor, with large boulders detracting from the general scenery behind.

My one major criticism is that the photographs too often show Snowdonia in a sunny and picturesque light. There is the occasional cloudy photograph, but I know from many years of cold and wet experience that Snowdonia has a very high rainfall and cloudy climate.

This collection of photographs with short descriptions will appeal to the fans of Poucher's books, but it is in the old fashioned mould of scenery and mountain photography.

ADH

HISTORICAL RECORDS OF THE BURBOT *LOTA LOTA* (LINNAEUS 1758) IN THE RIVER HULL, NORTH HUMBERSIDE

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INTRODUCTION

The purpose of this paper is to examine records of the former presence of burbot *Lota lota* in the River Hull in Watsonian vice county 61, the former East Riding of Yorkshire. The habitat and past and present distribution of the species are also briefly examined.

HABITAT AND DISTRIBUTION

The burbot or eelpout is the only European freshwater member of the cod family *Gadidae*, occurring in rivers and lakes throughout much of Europe, Asia and North America (Maitland 1977). It is reported to live in deep water and shelter under stones and in holes in river banks. Their preference for this situation is highlighted by Yarrel's (1836) allusion to the burbot's folk name, 'coney-fish', referring to its habit of 'lurking and hiding itself in holes like a rabbit'; indeed, Grabham (1907) reported having seen them taken out of water vole holes.

Several authors mention that the burbot is active at low temperatures and breeds in winter. As with other members of the cod family, a large number of eggs are laid; Cacutt (1979) puts the number at up to three million. The burbot is said to feed mainly on invertebrates when young and fish when adult (Maitland 1977). In Europe, the burbot reaches a weight of 32 kg (72 lb) but in Britain the largest recorded is a specimen of 3.63 kg (8 lb) from the River Trent, with 0.68 kg (1.5 lb) being average (MacMahon 1946).

Until recently, the burbot occurred in the British Isles in the rivers of eastern England between Suffolk and Durham. However, the species is now thought to be extinct throughout this range (Maitland & Lyle 1988). There is some evidence that in earlier times the burbot was common within parts of its British distribution. Phillips and Rix (1988) quote from Mancall's *Booke of Fishing with Hooke and Line* written in 1590 that '(burbot) have such a plentie in the fenne brooks, they feed their hogges with them'. In more recent times, the species has generally been regarded as uncommon in Britain. Of rivers in Yorkshire and adjacent areas, Yarrell (1836) lists its presence in the Skern, the Darlington tributary of the Tees, the Ouse, Derwent and the Trent 'from where Nottingham market is occasionally supplied with examples for sale'. Clarke and Roebuck (1881) refer to the burbot as 'local' and 'far from being numerous' in Yorkshire waters, listing it as being 'comparatively common' in the Wiske, Foss, Ouse below Naburn, the Lower Derwent and in dykes around Selby. They also refer to its 'scarce' occurrence in the Codbeck, Nidd, Wharfe and in the Seven, Pickering Beck and other tributaries of the Upper Derwent. To these waters can be added Scalby Beck (Spaul 1956) and the river Idle and New Idle Drain (Bunting et. al. 1974).

There are few 20th century records. Maitland (1972) recorded it in 24 ten kilometre squares before 1960 and in only six for the period 1960–1972. Maitland did not indicate that the burbot's distribution included the River Hull. He did however include the Yorkshire Rivers Derwent and Ouse as being within the burbot's range and included a post-1960 station for the Derwent.-

Some doubt appears to exist as to when the last live burbot was seen in British waters. During the 1950s and 1960s the British angling press carried a number of items attempting to determine whether burbot still survived but no definite information was forthcoming (Cacutt 1979). It would seem unlikely that the burbot still exists in British waters.

THE RIVER HULL

The River Hull is a relatively short river, c. 50 km from source to mouth. It originates in several springs on the chalk wolds north of Driffield from where it runs south to the Humber at Kingston upon Hull. Over its lower reaches it is tidal. The River Hull valley has changed

dramatically over the centuries from an area of marsh and mere to the present tightly embanked river and surrounding rich farmland of today (Sheppard 1958). At present, the river supports a rich fish fauna with trout important on the upper reaches and tributaries and 'coarse' fish dominating on the lower stretches until the salinity near the mouth of the river restricts their distribution. Angling is popular on the river at easily accessible points.

BURBOT RECORDS FROM THE RIVER HULL

Although Clarke and Roebuck (1881) regarded the burbot as being 'comparatively common' in the River Hull, the only specific allusions to its capture are contained in a paper presented by H. M. Foster to the Hull Scientific and Field Naturalists' Club in 1898 and published in its *Transactions* for that year. The section referring to the burbot is reproduced in full here: 'The BURBOT is occasionally found in the Hull, but during the last few years very few instances of its occurrence have come under observation. "Ike", a well-known professional fisherman, informs me he has in previous years caught as many as ten during one night's fishing. The largest specimen I have seen taken weighed 2 lbs., and was caught on a night line baited with a dead fish.'

Writing in 1922, Procter noted that the burbot occurred in the River Hull and Humber but that it was much rarer at the time of writing than it had been thirty years earlier (1890s). Procter's reference to the occurrence of the burbot in the Humber estuary is of interest, as the British literature does not appear to contain any other reference to estuarine dwelling although the species does occur in brackish parts of the Baltic (Phillips & Rix 1988).

DISCUSSION

Due to the scarcity of records it is not possible to draw any firm conclusions regarding the burbot and its decline in the River Hull. It is, however, possible to confirm the past occurrence of the burbot in the river. Only one of the references, that of Foster (1898), contains an apparent first-hand account of a record, that of a specimen caught on a night line. Foster's mention of 'Ike' taking up to ten burbot in an evening is of interest, as this could suggest a local abundance of the species at some locations on the River Hull during the latter part of the 19th century.

Foster (1898) and Proctor (1922) both comment on an apparent decline in burbot numbers in the River Hull at the turn of the century. This decline seems to correspond with a decline over the whole of the fish's British range, which apparently continued throughout this century until the species became extinct at some time in the last thirty years. The causes of this decline remain unknown. Maitland and Lyle (1988) suggest pollution as a possible cause. Further research into the pollution history of the River Hull may prove useful on this point. Several other factors may have resulted in the burbot's decline, for example, habitat loss through changes in river design and management. The burbot's preferred habitat of meandering and often tidal lowland rivers, with banks undercut and honeycombed with networks of water vole burrows, has been replaced, due to the priorities of flood prevention and land drainage efficiency, by clinically managed embanked trences, their tidal influences curtailed by weirs or locks. Climatic warming may also have been influential. The reference to this cold-preferring species occurring in prodigious abundance during the 16th century interestingly coincides with the period of Britain's 'Little Ice Age'.

A subsequently less severe climate may have rendered burbot populations less consistent at successful spawning. It may be for the same reason that the burbot's historic range in Britain, restricted to the eastern counties within the February 34 and 45°F isotherms, does not extend to areas subjected to a milder Atlantic climate.

The widespread and regular stocking of potentially more competitive fish species for sporting purposes may have lessened the ability, particularly of young burbot, to replace ageing populations. It is possible that a combination of some of these and other factors caused the demise of the burbot. Until the reasons for the burbot's decline are better understood it is unlikely that any attempt to reintroduce the species into Britain would be successful.

A major problem facing natural historians interested in fish, both in the past and today, is that those most likely to come into contact with them, professional fishermen in the past and anglers today, leave few written records of their catches. It is therefore difficult to build up a picture of fish distribution today, let alone that of a century ago. The rapid disappearance of a large vertebrate such as the burbot from the Yorkshire fauna highlights how little attention has been paid by naturalists and river authorities to the area's fish fauna. The loss of the burbot should act as a warning and prompt some work on Yorkshire's fish fauna.

ACKNOWLEDGEMENTS

I would like to thank Colin Howes of the Doncaster Museum for his many constructive comments made regarding this paper. Of particular importance were his observations made on burbot abundance in the 'Little Ice Age' and also his remarks concerning the former distribution of the species in Yorkshire.

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A NEW MILLIPEDE FOR YORKSHIRE

J. P. RICHARDS

While searching for the hot-house species of Myriapoda and Isopoda in the Sheffield University Botanical Gardens in June 1990, I turned up the woodlouse *Armadillidium nasatum* Budde-Lund, 1885, running beneath polythene sheeting, previously only recorded for South Yorkshire from a plant pot in Sheffield Museum.

This alone was a nice enough find, but searching under stones beneath a *Sorbus aria* in the Gardens produced two further species of note, both millipedes. The first was *Macrosternodesmus palicola* Brolemann, 1908, an uncommon species first found in Yorkshire in 1984,

and the other *Cylindroiulus vulnerarius* (Berlese, 1888) known only from five other sites in Britain, this being the first Yorkshire record. Its known localities, London, Manchester, Swansea, Hampshire and Dublin, seem to have no logical pattern, and the factors affecting distribution are unlikely to be understood until further records have been made. In the meantime, look out for a small *blind* coffee coloured snake millipede with a short tail and bright orange spots along its side.

THE DOTTEREL



Photo: John Knight

The Dotterel, arguably our most beautiful plover, has in the past nested sparsely on the Yorkshire Fells and may still do so irregularly. It is much better known as an exciting annual spring passage migrant: 'trips', as the parties of Dotterel are known, stop-off each spring at regular places in the Wolds and on the North Yorks moors. Their stay in these places may last only for a few hours or even minutes or for several days; the photograph shows an individual that stayed in the same area for at least 13 days, being first seen on 24 May and remaining at least until 5 June 1989; it was seen to have a severely damaged upper mandible which may have caused it to stay longer than is usual, although it appeared to feed without difficulty and was in full breeding plumage.

The name Dotterel originates from their apparent tameness; implying that they are stupid, they have been called 'Moss fools' and 'Daft Dotterel', and in the poem 'Philip Sparrow' written by John Skelton about 500 years ago we read of 'The shoveller with his broad beak; the dotterel, that foolish peke', its reputation obviously being well known through the centuries. The photograph was one of several taken as the bird foraged, completely ignoring the photographer.

OBITUARIES

JOAN APPLEYARD, PRESIDENT 1981

Joan Appleyard (née Wincott) was born in Coventry in December 1906. She joined the YNU in 1946, specialising in mosses. She was an active member of the British Bryological Society, becoming its President for 1966–67, and she was also its referee for the Hypnaceae.

In the mid-1950s, Joan left Yorkshire for the south, but still kept her links with the Union and her friends here, studying mosses in the field whenever she visited.

Joan was President of the Union, nominated by the Bryological Section, in 1981. During that year she came up from Wells for at least two YNU field meetings. A highlight of her year of office was her visit to the Royal Garden Party as one of the four YNU guests, when she was presented to our Patron, HRH the Duchess of Kent.



Joan Appleyard (right) and Joyce Payne at a YNU field meeting c. 1960

In her Presidential Address, purposely delivered without the distraction of slides, she gave a wide ranging review of Yorkshire bryophytes, with the emphasis on recent developments and discoveries.

Although Joan's years in Yorkshire came at an early stage in the development of her interests in bryophytes, she made a number of important new records and published short notes and excursion reports in *The Naturalist*. Subsequently she became one of the most

active and dedicated of British field bryologists and she continued to make outstanding discoveries until ill health curtailed her activities. One of her later discoveries, the moss *Brachythecium appleyardiae*, was named in her honour as a species new to science found in her localities, Wiltshire and Somerset.

Sadly, in 1988, Joan resigned from the Union due to illness; she died in Wells in June 1989. In a quiet way and with real dedication she contributed much to the work of the YNU.

J. E. Duncan

EDWARD WRIGLEY AUBROOK (1915–1990)

When Edward Wrigley Aubrook, 'Ted' to his friends, died on 18 April 1990, Yorkshire lost one of its most eminent coleopterists. Ted was a native of Oldham, born on 1 September 1915. Prior to his move to Yorkshire he had experience as Assistant Curator at the Museum and Art Galleries, Paisley, as Assistant in the Department of Entomology at the University Museum, Oxford, and as Assistant in the Department of Agricultural Entomology at Manchester University. When Ted moved to Yorkshire in 1939, he became Assistant Curator and Meteorological Recorder at the Tolson Museum, Huddersfield. After a wartime period as Assistant Director, he was appointed Director in 1946, a post which he held until his retirement in 1979. Part of his work there involved the running of an insect identification service for the people of Huddersfield. Due to Ted's expertise and enthusiasm this service put the museum on the map as one of Yorkshire's leading entomological centres. His services to museums were recognised by a Fellowship of the Museums Association, and the award of the Queen's Silver Jubilee Medal in 1977.

At the age of 10, Ted showed a great interest in insects and he began to collect and set butterflies. His involvement with Coleoptera started in his teens, for in 1933 he purchased the then new *A Practical Handbook of British Beetles* by Norman H. Joy, a work which was to stand him in good stead. After joining the Union in December 1959, he became Coleoptera Recorder in 1962, a post which he held for ten years; many of his reports appear in *The Naturalist*. Over the years he published a total of 38 scientific notes and papers in various journals, two of which described species new to the British list. Details of the discovery of *Oxypoda nigricornis* Mot. can be found in *The Entomologist* 101: 71–72 (co-authored with Colin Johnson) and *Cis dentatus* Mell. in *The Entomologist* 103: 250–251. He was also fortunate in collecting two beetle species which proved to be new to science. The first, *Micrambe aubrooki* Donisthorpe, was taken at a flower show in Manchester during November 1934. This is the only known specimen and now resides in The Natural History Museum, London. The other species, *Notoptenidium aubrooki* Johnson, stemmed from his collecting in New Zealand (on visits to his only daughter, the late Ann Taylor). Three specimens of this species were found near Rotorua in January 1981, and two of these are now in the Manchester Museum, the other being in the New Zealand Arthropod Collection at DSIR, Auckland.

His Coleoptera collections, when amassed, number in excess of 18,000; 12,000 British and over 6,000 from New Zealand. Since his British collection is of national importance, it has been proposed that his Tolson Museum specimens be amalgamated with those he gave to Manchester Museum. In such an event Tolson Museum would retain voucher specimens which, despite depleting the number of specimens, would give it a greater diversity of species. It would have pleased Ted if his British collection was eventually housed in such a prestigious museum as Manchester. His New Zealand collection is also housed at Manchester Museum, particularly as there are few collections of New Zealand insects in Britain; only The Natural History Museum can boast a larger assemblage within the British Isles. His collecting and



setting abilities can be seen in many museum and private collections, for Ted was very generous with specimens he regarded as 'duplicates'. He was elected a Fellow of the Royal Entomological Society in April 1946.

His interest in natural history also involved him with the ornithology of the Huddersfield area, and in 1958 he co-authored *Birds Around Huddersfield* with E. C. J. Swabey. This publication reviewed the status of bird species in the area and now helps set the scene for a book on the local avifauna. Not only was Ted an excellent natural historian, but he was also an accomplished fisherman, his membership of seven fishing clubs reflecting his interest. I well remember his delight at being accepted as a member of the Huddersfield Angling Association. His interest in fishing extended beyond the process of catching fish, for he also collected and renovated antique fishing tackle. Ted's avidity for collecting antiques didn't stop there, for he also had extensive collections of glass, pottery and books. His acquisition of various oddments over the years gradually transformed his cottage at Thurstonland into a miniature museum.

A memorial seat has been placed at Tolson Museum by his sister and her husband, Mr and Mrs E. W. Wood, at the entrance to what is probably Ted's greatest achievement there, the Transport Gallery. With a man of Ted's calibre, one could carry on recording the details of his many-faceted life indefinitely. Whether he is remembered as museum curator, coleopterist, fisherman or antique collector, all who knew Ted will remember him with great affection. I, like many others, am proud to have been one of his many friends.

M. L. Denton

BOOK REVIEWS

Mice of the British Isles by Michael Leach. Pp. 24, with 26 b/w and colour illustrations. Shire Publications, Aylesbury. 1990. £1.95 paperback.

Yet another (the 54th) lavishly illustrated and information-packed addition to Shire's now celebrated Natural History Series.

Michael Leach concisely reviews the identifications, diet, breeding, behaviour and ecology of our four members of the sub-family Murinae, the house mouse (*Mus musculus*), wood mouse (*Apodemus sylvaticus*), yellow-necked mouse (*A. flavicollis*) and harvest mouse (*Micromys minutus*).

The text is highly readable, but should be used with the similar but more technically competent booklets on the *Harvest Mouse* by Stephen Harris (1980) in the Blandford Mammal Society Series and *Woodmice* by John Flowerdew (1984) in the Nelson Mammal Society Series. The line drawings, apart from the rather elastic-sided woodmouse skull, are clear and effective, but this booklet is worth collecting for the author's series of outstanding colour photographs alone.

CAH

Predation upon Lambs by Foxes in the Absence of Control by R. Hewson Pp. 16. League Against Cruel Sports. 1990. Unpriced.

This paper summarises three years of research on fox ecology on the Eriboll Estate in north Sutherland. During this period no foxes were killed. In a detailed scientific study the author examined changes in fox numbers, home ranges and food and then compared his results with those of other upland areas in Britain. Hewson found little evidence of fox predation on live lambs, with rabbits and rodents comprising the main food sources. At Eriboll, fox numbers are largely determined by availability of these two items.

MJD

Birds of Singapore and South-East Asia by Sir John A. S. Bucknill and F. N. Chasen. Pp. 247, with 31 coloured plates by G. A. Levett-Yeats. First published 1927, re-published 1990 by Tynron Press, Scotland. £11.95.

This classic work, first published in 1927 under the title 'Birds of Singapore Island', no doubt provided an invaluable guide to the birds of the region at a time when there were few pocket sized books available to the amateur. Although the publishers give as the reason for changing the title the fact that the birds described in the book are not restricted to Singapore and recommend the book as a helpful guide to the birds of South-East Asia, I feel that this is perhaps misguided and the original title should have been retained. Anyone visiting this bird-rich region of South-East Asia would be well advised to take with them one of the more comprehensive modern field guides; nevertheless this book should not be ignored. Detailed descriptions of over 90 birds are accompanied by interesting, and at times naive, comments and field notes on behaviour and occurrence on the island, details that may not appear in the field guides. It is of interest to compare species and their occurrence in 1927 with their present-day status in Singapore and to note that in spite of the massive development that has taken place in the island many of the birds can still be found in the same areas.

The illustrations by Levett-Yeats add character to the book, being typical of many late Victorian and early Edwardian wildlife illustrations, their stiffness and pose indicating that they were drawn from museum specimens and not from the wild; in spite of being somewhat unnatural, they are still useful in identifying some species, although it is difficult not to be amused by some illustrations, in particular the Collared Scope Owl, perhaps more reminiscent of a marmalade cat.

As this book contains information not readily available in one small volume elsewhere, it can be recommended for general interest but not as a guide to be taken on holiday. It is well produced on quality paper and represents good value for money; read it before and after a visit to the Far East.

JEK

Audubon Perspectives. Fight for Survival by R. L. DiSilvestro. Pp. 284, with numerous colour & b/w plates. A Companion to the Audubon Television Specials. Wiley. 1990. \$34.95.

Although this book is written as a companion to an American television series it can be read as an independent work. It is a report on the conservation of wildlife habitats and endangered species, mainly from North America. The text charts the disastrous effects of man's economic growth on wildlife populations and propagates the message that man must live in harmony with natural ecosystems. Four chapters are devoted to endangered species of wolves, sharks, sea turtles and dolphins and three to the habitats represented by the forest, particularly in the Pacific North-West, the Arctic in Alaska and Nebraska's Platte river. The threats to these three habitats from the timber and oil industries and water projects are covered in detail. Much natural history is given of the threatened species with a history of man's relationship to them and the current research being carried out to aid the conservation of these species. The conservation issue is also treated in terms of the law and how politicians and the courts can help the conservationist. A final chapter covers the history of North American man as hunter, sportsman and poacher, with a study of the effects of such activities on the population dynamics of selected species including the 'slob hunting' of the Black Bear. The book contains a great deal of useful and interesting information and is very readable and well illustrated with very good photographs.

MEA

South Carolina. The Natural Heritage, photography by Robert C. Clark, text by Stephen H. Bennett and Thomas M. Poland. Pp. 96. University of South Carolina Press. 1990. \$35.00.

This is an interesting and unusual book which deals with the exotic flora and fauna of one of the smallest states of North America. It provides a comprehensive description of the natural history of South Carolina, showing unique animal and plant relationships existing in the Mountain Province, the Piedmont, the Sandhills, Upper Coastal Plain and the Coastal Zone. A spirited text provides insight into how weather, climate, geology and geography formed South Carolina's natural areas. As an additional bonus, this splendid book has many well produced photographs in glorious colour.

MET

Aphid Predators by Graham E. Rotheray. Pp. 77, including keys, numerous line drawings and 2 colour plates. **Mayflies** by Janet Harker. Pp. 56, including keys, numerous line drawings & 4 colour plates. Richmond Publishing Co. Naturalists' Handbooks Nos. 11 & 13. 1989. £5.95 each.

The Naturalists' Handbooks series is based on the concept that our education system is turning out a large number of young people with a basic grounding in the principles of scientific investigation at a time when there are many gaps in our knowledge of the biology and ecology of even the most common British animals and plants. The aim is to encourage these potential students to fill some of these gaps. The greatest gaps are among the invertebrates and all the Handbooks so far produced deal with these animals. The two approaches adopted in the series are illustrated by these two booklets — 'Mayflies' is a single taxon approach while 'Aphid Predators' is more ecological in its content. Each one provides sufficient background information to allow a novice to become familiar with our current level of knowledge, identification keys to allow the accurate identification of the relevant organisms and practical advice on the conduct of investigations. The text is liberally peppered with examples of the gaps in our knowledge. The narrower base of the single taxon approach is clearly more limited in this respect; 'Mayflies' does contain over two dozen suggestions for original studies with larvae and adults, but it allows a more complete coverage of its subject. I prefer the broader base of 'Aphid Predators' but this has presented its author with an impossibly large task. The suggestions for individual work are legion and the beauty of aphid studies is that every garden, park or piece of derelict ground will supply the raw material. And all gardeners can think about is how to get rid of them! The keys cover both adults and larvae of the well-known groups of aphid predators such as ladybirds, lacewings and hoverflies, but

the task of identifying casual predators among the ground beetles and rove beetles is not possible within the scope of this handbook and Rotheray does not attempt much more than a guide to more comprehensive literature. Both booklets continue the very high standard set by earlier ones in this series and both are highly recommended for anyone wishing to undertake some scientific natural history.

WAE

A Key to the Case-bearing Caddis Larvae of Britain & Ireland by I. D. Wallace, B. Wallace and G. N. Philipson. Pp. 237, with 93 text figures. Freshwater Biological Association Scientific Publication no. 51, Ambleside, Cumbria. 1990. £16.00.

This key assembles for the first time all the previously published information required for identifying case-bearing caddis larvae. In addition, the key to the Glossosomatidae is improved by new descriptions of distinguishing characters. A detailed key to the genera of the Hydroptilidae appears for the first time. It is now possible to distinguish between larvae of species of *Halesus*, *Micropterna* and *Stenophylax*. Nomenclature has been revised. A vast amount of information on the anatomy of cased caddis larvae is described and clearly illustrated, since for the purpose of identification, a larva must be examined in great detail. Measurements accurate to 0.01 mm may be necessary, and in order to do this, users of zoom microscopes must first calibrate. Much additional information is included in the key, and every effort has been made to facilitate correct identification. The book is elegant in appearance and is likely to be a standard work for many years. Its publication could stimulate interest in the ecology of case-bearing caddis larvae.

MA

Pond and Brook. A Guide to Nature in Freshwater Environments by Michael J. Caduto. Pp. xxi + 276. University Press of New England, Hanover and London. 1990. £15.55, paperback.

The many worlds of freshwater and the flora and fauna therein are dealt with in an extremely concise, readable and informative manner. Whilst North American in orientation, it is equally applicable to the European scene, if one excludes the references to specifically American animals and plants.

The subject matter covers the unique properties of water and the ecological principals that are basic to an understanding of aquatic life. The effects of human activities on freshwater environments provide a background to understanding the lives and living conditions of plants and animals to be found in ponds, lakes, streams, rivers and wetlands. Scattered through the text are references to collecting techniques and practical work, and there is a more than adequate glossary.

Although it is principally aimed at the amateur naturalist, this book does provide excellent reading for anyone with even the slightest interest in the freshwater environment, and is lavishly illustrated with black and white photographs and line drawings.

DTR

The Cambridge Illustrated Dictionary of Natural History by R. J. Lincoln and G. A. Boxshall. Pp. 413, with numerous small b/w illustrations. Cambridge University Press. 1990. £9.95, paperback edition.

This dictionary contains over 10,000 entries. There is a strong weighting towards living organisms and their habitats, though limited reference is made to fossils and past geological periods, and a few climatological terms are also included. Definitions are short and rarely run to more than 50 words. Many common names are included which may give it a market amongst the growing number of people who are developing an interest in the living world, though its main market is likely to be amongst serious students who are seeking to elucidate texts which use technical biological terms.

DEC

Correction:

The dates for Margaret Mee (*Naturalist* 115: 143, 1990) should read 1909–1988.

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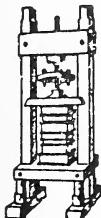
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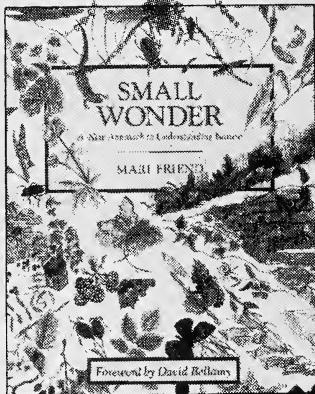
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NH

The Killarney Fern (*Trichomanes speciosum*) in Yorkshire —

F. J. Rumsey, A. D. Headley, D. R. Farrar and E. Sheffield

Birds in Farndale in 1990 — *Margaret and Richard Vaughan*

The sub-fossil occurrence of the Greater Silver Water-Beetle

Hydropilus piceus (L.) at Shirley Pool, South Yorkshire —
M. H. Dinnin

The Duck Leech *Theromyzon tessulatum* (O. F. Müller) in

Crose Mere, Shropshire — *R. M. H. Seaby, S. M. Spelling and*
J. O. Young

Notes on Yorkshire Mollusca 8: *Helicodiscus singleyanus*

(Pilsbry, 1890) new to Yorkshire — *A. Norris*

***Phaonia jaroschewskii* Schnabl (Diptera; Muscidae), the 'Hairy**

Canary' — *P. Skidmore*

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To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record his deep appreciation of this imaginative gesture.

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THE KILLARNEY FERN (*TRICHOMANES SPECIOSUM*) IN YORKSHIRE

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The Killarney Fern (*Trichomanes speciosum* Willd.) has been considered to be one of Britain's most endangered plants. Whilst always rare, it suffered severe depletion during the Victorian fern craze. Depredation by collectors is a continuing threat, with the loss of at least one Welsh site during the last 20 years. Although the plant has been accorded full legal protection since 1976, its continued survival must be considered precarious. Accordingly, considerable secrecy surrounds past and present records of this fern and most cultivated or herbarium specimens and rumoured occurrences lack locality data.

The first report of *Trichomanes speciosum* within the British Isles was, surprisingly, not on the oceanic western fringe to which subsequent records are restricted, but at a site close to Bingley, West Yorkshire. The plant was discovered by Dr Richard Richardson, and documented and depicted by Dilleniis in Ray (1724). Herbarium material from this site still exists at the British Museum (Jermy, *pers. comm.*). In 1758, it was said to be still plentiful in its original site, 'a dark cavern beneath a dripping rock', but when this was destroyed by alterations to a nearby well it was feared lost. Bolton (1785) found 'after several researches' a root close by in 1782, in which year it was also seen by Teesdale (1800). Lees (1888) suggested that these later discoveries from this site were of immature sporophytes and concluded 'it has long been extinct at Bingley' and then gives the following enigmatic statement: 'still in one station in the West Riding; James Backhouse *in litt.* I cannot more precisely indicate the locality'.

The name of Backhouse is inextricably linked with early discoveries of *Trichomanes* on the mainland of Britain. He reputedly knew the plant from at least two Welsh stations (Roberts 1979), in one of which it was particularly luxuriant and fertile, a condition recorded in only two populations from mainland Britain (D. A. Ratcliffe, *pers. comm.*). Unfortunately, this site has never been accurately located and similar plants have not been refound. As a nurseryman, Backhouse would have had access to Irish material and his finds have thus been treated with some suspicion.

The exact whereabouts of his later Yorkshire station is also apparently unknown. The locality area given by Lees (1888) would suggest it is not the same as that listed by Cheetham and Sledge (1943) as a presumed introduction from the Scammonden Valley area and mapped in G.R. 44/01 (Perring & Walters 1962). Given these uncertainties, the herbarium material collected by Richardson and subsequent 18th century records from Bingley constituted the only definite native occurrences of this plant in Yorkshire until this present study.

The discovery by one of us (DRF) of the gametophyte of this species at two Lake District sites in October 1989 (Rumsey *et al.* 1990) initiated a broader survey of areas considered suitable for gametophyte occurrence, given the known habitat preferences of closely related species in North America (Farrar *et al.* 1983). We were delighted to discover more than ten thriving populations in at least nine 10 km squares within vice-counties 63 and 64, and feel sure many more sites remain to be located. These gametophytes have undoubtedly been overlooked previously due to their appearance and habitat.

Unlike most pteridophyte gametophytes, that of *Trichomanes* is filamentous and perennial (Fig. 1), ultimately forming a mat-like weft which more closely resembles certain algae or

bryophyte protonemata. It produces specialised gemmae, a feature also found in the bryophytes *Tetradontium* and *Schistostega* (Edwards, 1978) which occupy similar niches and may be found near *Trichomanes* in Yorkshire sites. Gametophytic colonies in Yorkshire are restricted to deep crevices and caverns, under overhanging rocks. The porous acidic gritstone rocks are often in sheltered valleys with woodland cover and near streams. Characteristically, the gametophyte exists as patches beyond the limits of bryophytic growth and can be seen only with the aid of a torch.

The current scattered distributions and documented extinctions of more widespread 'Atlantic' species, e.g., *Hymenophyllum wilsonii*, *H. tunbrigense*, *Asplenium bilotii* and

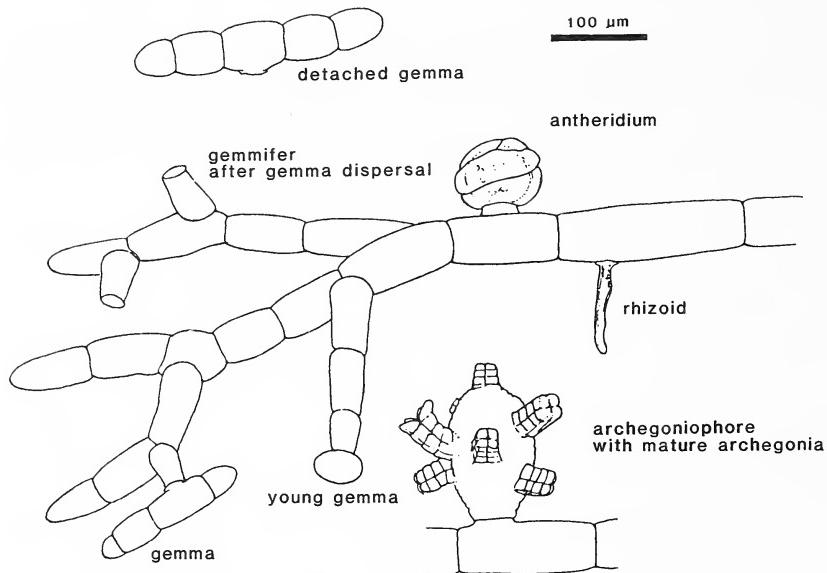


FIGURE 1
Trichomanes speciosum gametophyte.

Dryopteris aemula, within Yorkshire, suggest that prior to deforestation and later industrialisation, these species may have been more widely distributed. The sporophyte of *Trichomanes* is probably the most ecologically exacting of these and hence the first lost when conditions become sub-optimal. Its gametophyte, by virtue of its curious ecology, is however, capable of survival long after all other 'Atlantic' species, including bryophytes, have been lost. This is possible as the gametophyte is perennial, reproduces asexually and exploits a competition free niche, due largely to its ability to function at extremely low irradiance ($< 1 \mu\text{mole m}^{-2} \text{s}^{-1}$). The discovery of widespread populations of *Trichomanes* gametophytes often at, or near, sites where reports of other 'Atlantic' species have been considered dubious, suggests that many of these disputed records may be authentic.

Gametophytes have been seen to produce antheridia and archegonia in at least one site. Most excitingly, immature sporophytes have been seen at this site and at one other Yorkshire location. It is still not certain whether these sporophytes have arisen sexually or are products of apogamy. The production of filamentous outgrowths, indistinguishable from gametophytic tissue, from the extremities of the leaves may be evidence for an aberrant life cycle. It is unclear whether the present microclimate in the Yorkshire sites is suitable for the survival of mature sporophytes, although this was obviously the case during the 18th century at Bingley.

As a result of the discovery of a number of gametophyte records, *Trichomanes* would become ineligible for inclusion in the British Red Data book based purely on these new records (Perring & Farrell 1983)! The apparent inability of most gametophyte populations to produce sporophytes and the low fertility of the few remaining sporophytes, combined with our dearth of knowledge of the biology of this internationally threatened species, argue for its continued legal protection. To safeguard the potentially fragile sites of this species, strict confidentiality as to their location will be maintained by the authors. Removal of any part of the fern, including its gametophyte, is illegal, and verification must therefore be done non-destructively in the field. To this end the authors would be happy to confirm any suspected occurrence and would welcome any information on past sites, introductions, etc., of this species.

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BOOK REVIEWS

British Plant Communities. Volume 1. Woodlands and Scrub edited by J. S. Rodwell. Pp. 395, 25 figures including maps. Cambridge University Press, 1991. £70.00 hardback.

Sixty-two years have elapsed since Tansley's comprehensive review of British plant communities and this book is the first in a series which attempts to do the same, but with a more up to date analytical approach. It represents the culmination of the National Vegetation Classification (NVC) started in 1975. This was initiated by the Nature Conservancy Council, the British Ecological Society and four universities and was devised to establish 'a national and systematic phytosociological treatment of British vegetation'. This mammoth task involved a total of c.35,000 samples covering 80% of the 10 × 10 km squares in Britain.

The book covers the rationale and methods used in the NVC system and then covers the specific methods used for characterising woodland vegetation. It also describes the overall

patterns in woodland communities with associated soil, climate and management. There is a key to the 18 woodland and 7 scrub communities. The physiognomy of each community and sub-community is described in detail along with their synonyms, habitats and successional position. Floristic tables are given for each community, but only woodland communities have distribution maps.

The system does cover synonymous communities described by others for the British Isles and in some cases Europe. The nomenclature does not, however, correspond to the continental system, which has been perfected to a much higher degree than in this country. Having had personal experience in classifying Scottish woodland communities using the descriptions and keys contained in this book, I have found this system to work tolerably well. I would therefore recommend this as a reference book for any professional field ecologists who wish to survey and map woodland and scrub vegetation, but the price may even exclude it from some libraries as well as private bookshelves. The nature of the material contained within such a book is too tedious for those with a general interest in woodland ecology.

ADH

Myriapoda and the Ancestry of Insects by Wolfgang Dohle. Pp. iv + 28, with 15 b/w figures. Manchester Polytechnic, 1988. £2.50, obtainable from: J. G. Blower, Dept. of Environmental Biology, The University, Manchester M13 9PL.

This substantial essay embodies the contents of a lecture given by Professor Dohle at Manchester Polytechnic to commemorate the life and work of Dr Charles H. Brookes. Dr Brookes had carried out valuable research into the life cycles of millipedes before his untimely death in 1983. Prof. Dohle cites some of this work in this essay.

The outstanding feature of this publication is the accessibility of the language and the treatment of the subject to the general public. The phylogeny of the insects and the myriapods (millipedes and centipedes, chiefly) is a fairly fearsome subject, a classic problem in the comparative morphology of embryos, juveniles and adults. Prof. Dohle gives us firm but gentle guidance through the rocks and shoals of cladograms, anamorphosis and much else besides. As an added bonus, sandwiched among discussion on the ancestry of insects, is a paragraph about the reasons why such arcane matters should concern us. This is a quiet but powerful statement (although the context may seem unlikely!) of the needs of human beings to understand our true place in nature. The humble insect is a powerful challenge to human dominance of the globe. Our fondness for the technological fix ensures that this problem will increase rather than decrease in the future (through increased insecticide resistance for example). This essay is one small step towards humanity getting a grip on itself and learning to live on a planet which is a responsibility, not a consumable.

SLS

The Butterflies of Great Britain and Ireland. Volume 7, Part 1 of The Moths and Butterflies of Great Britain and Ireland (Hesperiidae to Nymphalidae), edited by A. Maitland Emmet and John Heath. Pp. ix + 370, with 24 colour plates, 74 maps and 22 black and white figures. Paperback edition revised with minor corrections, Harley Books, Colchester, 1990. £24.95

This edition is almost identical to the cloth-bound edition of 1989 which was so highly praised in a review in *The Naturalist* in 1990 (pp. 31–32), but it comes at half the price. This should put this very handsome and authoritative volume within the reach of many who balked at £49.50, although the cloth-bound edition in regular use can be expected to have a longer life and will lie open at every page. The first 50 pages of text in the paperback and all the colour plates at the back will not lie open and must be held down. You pay your money and you take your choice.

JHF

BIRDS IN FARNDALE IN 1990

MARGARET AND RICHARD VAUGHAN

Bee Stone, Farndale, Kirkbymoorside, York Y06 6XH

INTRODUCTION

Farndale (Fig. 1) is geographically similar to the valleys on either side of it in the North Yorkshire Moors, Rosedale and Bransdale. It is narrow, steep-sided and thickly wooded at its southern end, where it becomes Douthwaite Dale, and broadens out in the middle at Low Mill and Church Houses before narrowing again at the dale head. Its geographical limits are clearly defined on either side and at its head by the height of land, which reaches to a little over 1000 feet and consists of broad flat ridges of open heather moorland. Thus from the point of view of its bird life, Farndale forms a rather isolated area of mixed woodland, rough moorland and grassland, comprising about 30 working farms mostly concentrating on sheep-rearing. The aim of this paper is to present in summary form the results of a year's bird recording in the dale and then to consider certain features of the dales avifauna revealed by these data.

METHODS AND RESULTS

Throughout 1990 we resided at Bee Stone, Farndale, our only long absence being between 22 May and 26 June. During 299 days of observation we recorded all bird species seen or heard at or from Bee Stone, and a summary of our daily records is given in a month-by-month form in Table 1.

During 1990 we also recorded all bird species present in Farndale, both by means of walks round the dale, during which all species present were listed, and by means of the daily bird log at Bee Stone. The months during which each species was recorded in Farndale are shown in Table 2.

For the sake of completeness, it may be added that the following species, not seen in Farndale in 1990, were recorded by us in Farndale once or more in the years 1984–1989 inclusive: Buzzard (*Buteo buteo*), Redshank (*Tringa totanus*), Great Black-backed Gull (*Larus marinus*), Siskin (*Carduelis spinus*) and Crossbill (*Loxia curvirostra*).

DISCUSSION

Inevitably, our results tend to establish the relative conspicuousness of the different species recorded, rather than their relative abundance. Thus noisy birds like Tawny Owl and Jackdaw are recorded often while the probably ever-present Sparrowhawk is almost never heard and seldom seen. The fact that some species visited the garden at Bee Stone regularly in winter to take food put out for them must also be taken into account. These were Pheasant, Great Tit, Blue Tit, Coal Tit, Marsh Tit, Nuthatch, Blackbird, Robin, Dunnock and Chaffinch.

Only 84 species were recorded in Farndale in 1990. This rather short list (see Table 2) may reflect the dale's relative geographical isolation, the absence of any sizeable body of water, or the complete absence of towns or even villages. This last feature certainly explains the absence of the Collared Dove (*Streptopelia decaocto*), which has however colonised villages like Hutton-le-Hole on the moorland fringe near Farndale. Other absentees are the Little Owl (*Athene noctua*) and Lesser Spotted Woodpecker (*Dendrocopus leucotos*), and the Skylark, which, though occasionally recorded flying over, was not seen to visit the dale to feed or breed. There are no suitable breeding sites for Sand Martins (*Riparia riparia*), but it is surprising that these birds were not seen flying over. The Willow Tit (*Parus montanus*) was not recorded in 1990, though the Marsh Tit is common. Otherwise the Farndale bird list is probably representative enough of similar terrain elsewhere in Yorkshire in terms of species present, but when the numbers, seasonal movements and other features of some species are considered there may be surprises in store.

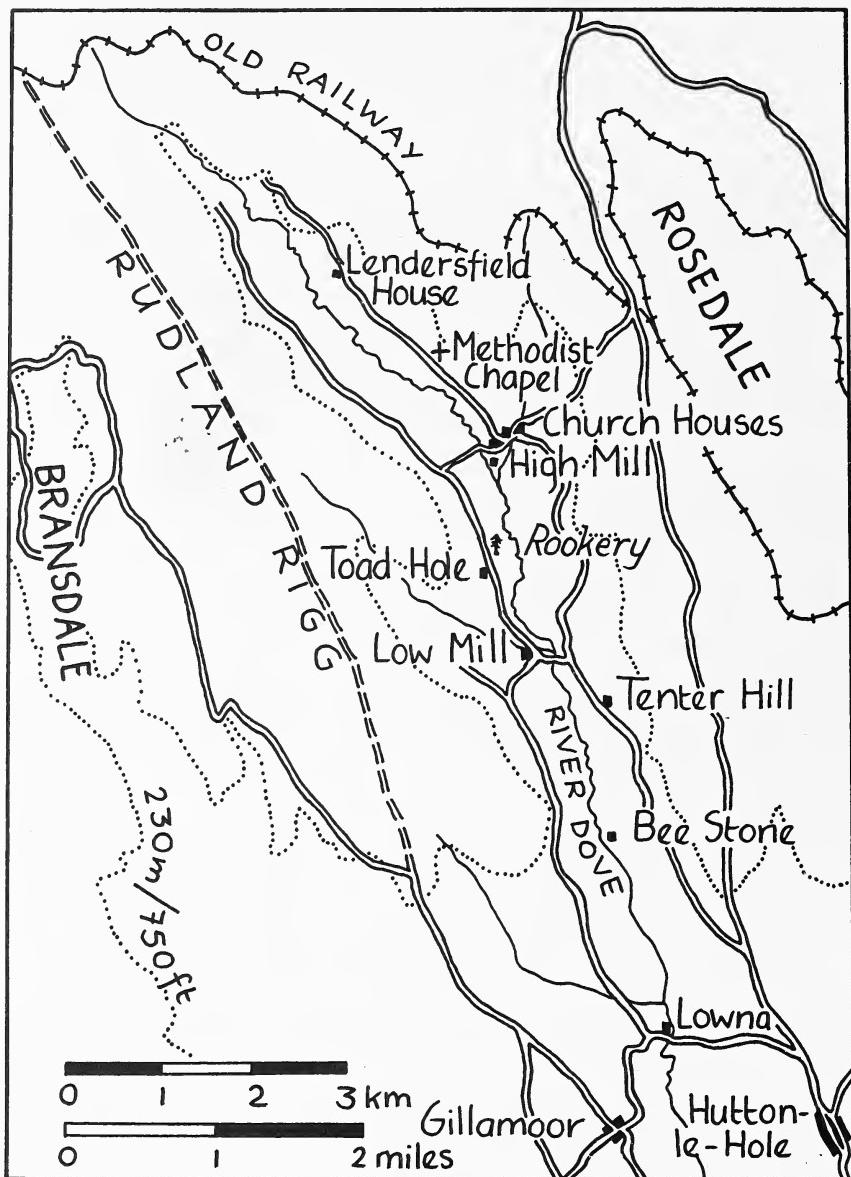


FIGURE 1
Map of Farndale.

Herons are present in ones and twos throughout the year; the nearest herony is in Sleightholm Dale only a few miles away. Three species of duck were seen in Farndale in 1990: the Mallard was present throughout the year; the Teal and Goosander, seen in May, may have bred sparsely. Of birds of prey, the Sparrowhawk and Kestrel were common residents in 1990; Merlin (Plate 1) was recorded once, and we received reports from local people of Buzzard and Peregrine (*Falco peregrinus*).

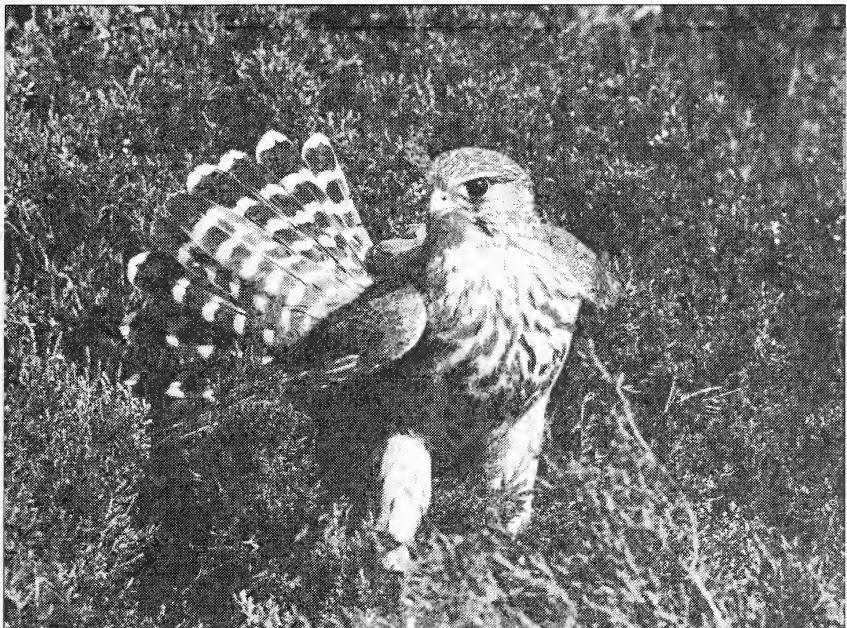


PLATE 1

The Merlin is a sparsely distributed summer visitor and breeding bird which is probably still declining in numbers in the North Yorkshire Moors. It was recorded in Farndale only once in 1990.

It is hardly surprising that apart from the Chaffinch, the most frequently observed bird at Bee Stone in 1990 was the Pheasant. These are reared and released in large numbers by the estate's gamekeeper. So far we have no explanation for the fact that only male Pheasants — up to six at a time — have been seen feeding in winter in our garden at Bee Stone, unless it be that females are less adventurous. Other game birds are a feature of the Farndale avifauna. Numbers of captive-bred Red-legged Partridges (*Alectoris rufus*) and Chukars (*Alectoris chukar*) have been released in the dale in recent years and most of the birds there now are hybrids (Plate 2). The Grey Partridge seems to be in rapid decline. A pair was seen in May but the 1990 breeding season was apparently disastrous and the only Grey Partridges seen in the second half of the year were two or three birds on 13 September. Red Grouse can often be heard calling from the moorland ridges above the dale.

TABLE I
Number of records per month of different bird species seen or heard at Bee Stone, Farndale, 1990,
with total for the year.

	Ja	Fe	Ma	Ap	Ma	Ju	Au	Se	Oc	No	De	Total	Notes
Number of species seen per month													
Days of observation per month	33	33	40	51	48	39	48	46	39	37	31	34	
Heron (<i>Ardea cinerea</i>)	28	27	30	29	20	9	31	30	26	24	18	27	
Mallard (<i>Anas platyrhynchos</i>)	1	—	2	—	5	2	7	1	2	1	—	1	22
Goosander (<i>Mergus merganser</i>)	—	—	—	—	1	—	—	—	—	—	2	21	1
Sparrowhawk (<i>Accipiter nisus</i>)	2	4	5	3	4	1	3	1	—	1	2	1	27
Merlin (<i>Falco columbarius</i>)	—	—	—	1	—	—	—	—	—	—	—	—	1
Kestrel (<i>Falco tinnunculus</i>)	1	1	4	1	—	2	17	7	1	—	—	1	35
Red Grouse (<i>Lagopus lagopus</i>)	12	2	3	7	9	—	2	4	10	4	4	—	57
R-1 Partridge (<i>Alectoris rufa/chukar</i>)	—	—	1	8	6	—	10	2	4	—	1	32	1
Grey Partridge (<i>Perdix perdix</i>)	27	26	29	29	20	8	26	30	26	22	17	24	284
Pheasant (<i>Phasianus colchicus</i>)	1	—	—	2	—	—	5	—	—	1	—	—	9
Lapwing (<i>Vanellus vanellus</i>)	—	—	—	1	1	—	—	—	—	—	—	—	2
Golden Plover (<i>Pluvialis apricaria</i>)	—	—	—	4	1	1	—	—	—	—	—	—	6
Snipe (<i>Gallinago gallinago</i>)	—	—	—	12	13	6	6	9	—	—	—	—	46
Woodcock (<i>Scolopax rusticola</i>)	—	—	—	15	27	19	6	13	5	—	—	—	85
Curlew (<i>Numenius arquata</i>)	—	—	—	—	—	—	1	—	—	—	—	—	1
Herring Gull (<i>Larus argentatus</i>)	—	—	—	—	2	—	—	1	—	—	—	—	3
Common Gull (<i>Larus canus</i>)	—	—	—	7	16	8	4	3	—	—	—	—	38
Black-headed Gull (<i>Larus ridibundus</i>)	—	—	6	16	10	9	4	3	1	5	—	—	54
Stock Dove (<i>Columba oenas</i>)	9	19	27	28	20	8	31	30	25	22	13	15	247
Woodpigeon (<i>Columba palumbus</i>)	—	—	—	—	16	6	—	—	—	—	—	—	1
Cuckoo (<i>Cuculus canorus</i>)	—	—	—	—	—	—	—	—	—	—	—	—	1
Barn Owl (<i>Tyto alba</i>)	18	19	—	—	—	—	—	—	—	—	—	—	212
Tawny Owl (<i>Strix aluco</i>)	—	—	—	—	—	—	—	—	—	—	—	—	20
Swift (<i>Apus apus</i>)	—	—	—	—	—	—	—	—	—	—	—	—	1
Green Woodpecker (<i>Picus viridis</i>)	—	—	1	4	2	10	1	19	19	14	2	6	86

G. S. Woodpecker (<i>Dendrocopos major</i>)	heard calling
Swallow (<i>Hirundo rustica</i>)	present 28.4 to 26.9
Carrion Crow (<i>Corvus c. corone</i>)	
Rook (<i>Corvus frugilegus</i>)	
Jackdaw (<i>Corvus monedula</i>)	flying over
Magpie (<i>Pica pica</i>)	
Jay (<i>Garrulus glandarius</i>)	
Great Tit (<i>Parus major</i>)	usually only calling
Blue Tit (<i>Parus caeruleus</i>)	
Coal Tit (<i>Parus ater</i>)	
Marsh Tit (<i>Parus palustris</i>)	
Long Tailed Tit (<i>Aegithalos caudatus</i>)	
Nuthatch (<i>Sitta europaea</i>)	
Tree Creeper (<i>Certhia familiaris</i>)	
Wren (<i>Troglodytes troglodytes</i>)	
Mistle Thrush (<i>Turdus viscivorus</i>)	
Fieldfare (<i>Turdus pilaris</i>)	
Song Thrush (<i>Turdus philomelos</i>)	
Redwing (<i>Turdus iliacus</i>)	
Blackbird (<i>Turdus merula</i>)	
Redstart (<i>Phoenicurus phoenicurus</i>)	
Robin (<i>Erithacus rubecula</i>)	
Blackcap (<i>Sylvia atricapilla</i>)	
Lesser Whitethroat (<i>Sylvia curruca</i>)	
Willow Warbler (<i>Phylloscopus trochilus</i>)	
Goldcrest (<i>Regulus regulus</i>)	
Spotted Flycatcher (<i>Muscicapa striata</i>)	
Dunnock (<i>Prunella modularis</i>)	
Meadow Pipit (<i>Anthus pratensis</i>)	
Pied Wagtail (<i>Motacilla alba</i>)	
Grey Wagtail (<i>Motacilla cinerea</i>)	
Starling (<i>Sturnus vulgaris</i>)	
Greenfinch (<i>Carduelis chloris</i>)	
Goldfinch (<i>Carduelis carduelis</i>)	
Linnet (<i>Carduelis cannabina</i>)	
Redpoll (<i>Carduelis flammea</i>)	
Chaffinch (<i>Fringilla coelebs</i>)	
House Sparrow (<i>Passer domesticus</i>)	usually heard calling

TABLE I
Number of records per month of different bird species seen or heard at Bee Stone, Farndale, 1990,
with total for the year.

Total number of species in year: 64 Number of days of observation: 299

	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De	Total	Notes
Number of species seen per month	33	33	40	51	48	39	48	46	39	37	31	34		
Days of observation per month	28	27	30	29	20	9	31	30	26	24	18	27		
Heron (<i>Ardea cinerea</i>)	1	—	—	5	2	2	7	1	2	1	—	1	22	
Mallard (<i>Anas platyrhynchos</i>)	1	2	2	9	3	1	—	—	1	—	—	2	21	
Gosander (<i>Mergus merganser</i>)	—	—	—	—	1	—	—	—	—	—	—	—	1	
Sparrowhawk (<i>Accipiter nisus</i>)	2	4	5	3	4	1	3	1	—	1	2	1	27	
Merlin (<i>Falco columbarius</i>)	—	—	—	1	—	—	—	—	—	—	—	—	1	
Kestrel (<i>Falco tinnunculus</i>)	1	1	4	1	—	2	17	7	1	—	—	1	35	
Red Grouse (<i>Lagopus lagopus</i>)	12	2	3	7	9	—	2	4	10	4	4	—	57	
R-R Partridge (<i>Alectoris rufa/chukar</i>)	—	—	1	8	6	—	10	2	4	—	1	—	32	
Grey Partridge (<i>Perdix perdix</i>)	—	—	—	—	1	—	—	—	—	—	—	—	1	
Pheasant (<i>Phasianus colchicus</i>)	27	26	29	29	20	8	26	30	26	22	17	24	284	
Lapwing (<i>Vanellus vanellus</i>)	1	—	—	2	—	—	5	—	1	—	—	—	9	
Golden Plover (<i>Pluvialis apricaria</i>)	—	—	—	—	1	1	—	—	—	—	—	—	2	
Snipe (<i>Gallinago gallinago</i>)	—	—	—	4	1	1	—	—	—	—	—	—	6	
Woodcock (<i>Scolopax rusticola</i>)	—	—	12	13	6	6	9	—	—	—	—	—	46	
Curlew (<i>Numenius arquata</i>)	—	—	15	27	19	6	13	5	—	—	—	—	85	
Herring Gull (<i>Larus argentatus</i>)	—	—	—	—	—	1	—	—	—	—	—	—	1	
Common Gull (<i>Larus canus</i>)	—	—	—	2	—	—	—	1	—	—	—	—	3	
Black-headed Gull (<i>Larus ridibundus</i>)	—	—	7	16	8	4	3	—	—	—	—	—	38	
Stock Dove (<i>Columba oenas</i>)	—	6	16	10	9	4	3	1	5	—	—	—	54	
Woodpigeon (<i>Columba palumbus</i>)	9	19	27	28	20	8	31	30	25	22	13	15	247	
Cuckoo (<i>Cuculus canorus</i>)	—	—	—	—	16	6	—	—	—	—	—	—	22	
Barn Owl (<i>Tyto alba</i>)	—	—	—	—	—	—	—	—	—	—	—	—	1	
Tawny Owl (<i>Strix aluco</i>)	18	19	27	20	13	5	14	24	18	22	11	21	212	
Swift (<i>Apus apus</i>)	—	—	—	—	3	5	10	2	—	—	—	—	20	
Green Woodpecker (<i>Picus viridis</i>)	—	1	4	2	10	1	19	19	14	2	6	8	86	
 —	 —	 —	 —	 —	 —	 —	 —	 —	 —	 —	 —	 —		
G. S. Woodpecker (<i>Dendrocopos major</i>)	—	—	2	6	4	1	2	3	1	1	—	1	21	
Swallow (<i>Hirundo rustica</i>)	—	—	—	3	20	8	31	30	16	—	—	—	108	
Carriion Crow (<i>Corvus c. corone</i>)	5	4	9	9	3	3	11	4	2	9	3	3	65	
Rook (<i>Corvus frugilegus</i>)	5	3	4	6	3	3	14	16	19	13	5	—	91	
Jackdaw (<i>Corvus monedula</i>)	18	21	29	29	20	8	22	20	26	23	16	13	245	
Magpie (<i>Pica pica</i>)	—	—	2	2	—	—	8	9	13	8	8	3	53	
Jay (<i>Garrulus glandarius</i>)	14	8	15	15	7	6	8	8	10	11	6	4	112	
Great Tit (<i>Parus major</i>)	28	27	29	29	12	—	5	3	24	20	17	26	220	
Blue Tit (<i>Parus caeruleus</i>)	28	27	30	26	19	6	21	29	26	23	17	26	278	
Coal Tit (<i>Parus ater</i>)	27	22	22	24	9	—	1	5	23	20	18	22	193	
Marsh Tit (<i>Parus palustris</i>)	27	22	25	5	1	1	6	6	6	17	15	24	155	
Long Tailed Tit (<i>Aegithalos caudatus</i>)	2	3	8	9	11	1	3	9	5	5	2	2	60	
Nuthatch (<i>Sitta europaea</i>)	19	21	14	16	1	2	16	15	17	12	15	19	167	
Tree Creeper (<i>Certhia familiaris</i>)	8	7	1	—	—	2	1	4	5	2	3	3	33	
Wren (<i>Troglodytes troglodytes</i>)	6	12	26	28	19	7	30	17	22	17	10	13	207	
Mistle Thrush (<i>Turdus viscivorus</i>)	1	21	29	23	12	2	2	1	2	5	6	11	115	
Fieldfare (<i>Turdus pilaris</i>)	2	1	—	1	—	—	—	—	—	5	1	1	11	
Song Thrush (<i>Turdus philomelos</i>)	—	5	29	28	20	7	6	1	—	—	—	—	96	
Redwing (<i>Turdus iliacus</i>)	—	—	—	—	—	—	—	—	—	1	—	1	2	
Blackbird (<i>Turdus merula</i>)	27	25	30	29	20	8	28	11	11	18	11	15	233	
Redstart (<i>Phoenicurus phoenicurus</i>)	—	—	—	2	20	8	13	6	2	—	—	—	51	
Robin (<i>Erithacus rubecula</i>)	28	27	30	28	17	4	29	26	25	20	14	19	267	
Blackcap (<i>Sylvia atricapilla</i>)	—	—	—	—	—	2	—	—	1	—	—	—	3	
Lesser Whitethroat (<i>Sylvia curruca</i>)	—	—	—	—	—	—	1	—	—	—	—	—	3	
Willow Warbler (<i>Phylloscopus trochilus</i>)	—	—	—	10	20	4	19	15	1	—	—	—	1	
Goldcrest (<i>Regulus regulus</i>)	—	—	—	—	—	—	—	—	—	3	4	1	9	
Spotted Flycatcher (<i>Muscicapa striata</i>)	—	—	—	—	—	—	20	9	—	—	—	—	29	
Dunnock (<i>Prunella modularis</i>)	28	26	29	26	19	6	7	—	8	21	13	12	195	
Meadow Pipit (<i>Anthus pratensis</i>)	—	—	3	11	—	—	2	1	—	—	—	—	17	
Pied Wagtail (<i>Motacilla alba</i>)	—	—	25	28	20	7	31	22	11	1	3	—	148	
Grey Wagtail (<i>Motacilla cinerea</i>)	—	3	5	4	—	—	2	5	—	2	1	1	23	
Starling (<i>Sturnus vulgaris</i>)	1	3	10	11	6	1	2	—	—	1	—	—	35	
Greenfinch (<i>Carduelis chloris</i>)	2	—	—	1	—	—	6	1	1	—	—	3	14	
Goldfinch (<i>Carduelis carduelis</i>)	1	—	2	12	8	4	31	27	10	1	5	2	103	
Linnet (<i>Carduelis cannabina</i>)	—	—	—	—	—	—	5	1	1	—	—	—	7	
Redpoll (<i>Carduelis flammea</i>)	6	2	3	4	1	—	4	2	3	4	2	7	38	
Bullfinch (<i>Pyrrhula pyrrhula</i>)	19	13	17	21	7	1	25	19	10	15	9	14	170	
Chaffinch (<i>Fringilla coelebs</i>)	28	27	31	29	20	8	26	28	24	22	18	24	285	
House Sparrow (<i>Passer domesticus</i>)	—	—	—	—	1	—	—	—	—	—	—	—	1	

TABLE 2
Months in which birds seen or heard in Farndale in 1990 were recorded

Heron (<i>Ardea cinerea</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	—	De
Teal (<i>Anas crecca</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Mallard (<i>Anas platyrhynchos</i>)	Ja	Fe	Ma	Ap	Ma	Ju	—	—	Se	—	—	De
Goosander (<i>Mergus merganser</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Sparrowhawk (<i>Accipiter nisus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	—	Oc	No	De
Merlin (<i>Falco columbarius</i>)	—	—	—	Ap	—	—	—	—	—	—	—	—
Kestrel (<i>Falco tinnunculus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Red Grouse (<i>Lagopus lagopus</i>)	Ja	Fe	Ma	Ap	Ma	—	Ju	Au	Se	Oc	No	—
R-1 Partridge (<i>Alectoris rufa/chukar</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Grey Partridge (<i>Perdix perdix</i>)	Ja	Fe	Ma	—	Ma	Ju	—	—	Se	—	—	—
Pheasant (<i>Phasianus colchicus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Moorhen (<i>Gallinula chloropus</i>)	—	Fe	Ma	Ap	Ma	—	—	—	—	—	—	—
Lapwing (<i>Vanellus vanellus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	—	Oc	—	—
Golden Plover (<i>Pluvialis apricaria</i>)	—	—	Ma	Ap	Ma	—	—	—	—	—	—	—
Snipe (<i>Gallinago gallinago</i>)	—	—	Ma	Ap	Ma	Ju	—	—	—	—	—	—
Woodcock (<i>Scolopax rusticola</i>)	Ja	—	Ma	Ap	Ma	Ju	Ju	Au	—	Oc	—	De
Curlew (<i>Numenius arquata</i>)	—	—	Ma	Ap	Ma	Ju	Ju	Au	—	—	—	—
Herring Gull (<i>Larus argentatus</i>)	—	—	—	—	—	Ju	—	—	—	—	—	—
Common Gull (<i>Larus canus</i>)	Ja	—	Ma	Ap	Ma	—	Ju	Au	—	—	—	—
Black-headed Gull (<i>Larus ridibundus</i>)	—	—	Ma	Ap	Ma	Ju	Ju	—	—	—	—	—
Stock Dove (<i>Columba oenas</i>)	—	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Woodpigeon (<i>Columba palumbus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Cuckoo (<i>Cuculus canorus</i>)	—	—	—	—	Ma	Ju	—	—	—	—	—	—
Barn Owl (<i>Tyto alba</i>)	—	Fe	—	—	—	—	—	—	—	—	—	—
Tawny Owl (<i>Strix aluco</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Swift (<i>Apus apus</i>)	—	—	—	—	Ma	Ju	Ju	Au	—	—	—	—
Kingfisher (<i>Alcedo atthis</i>)	—	—	—	Ap	—	Ju	Ju	Au	—	—	—	—
Green Woodpecker (<i>Picus viridis</i>)	—	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
G. S. Woodpecker (<i>Dendrocopos major</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	—	Se	Oc	—	De
Skylark (<i>Alauda arvensis</i>)	—	—	—	—	Ma	—	—	—	—	Oc	—	—
Swallow (<i>Hirundo rustica</i>)	—	—	—	Ap	Ma	Ju	Ju	Au	Se	—	—	—
House Martin (<i>Delichon urbica</i>)	—	—	—	—	—	Ju	Ju	Au	—	—	—	—
Carrion Crow (<i>Corvus c. corone</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Rook (<i>Corvus frugilegus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	—
Jackdaw (<i>Corvus monedula</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Magpie (<i>Pica pica</i>)	Ja	Fe	—	Ap	Ma	—	Ju	Au	Se	Oc	No	De
Jay (<i>Garrulus glandarius</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Great Tit (<i>Parus major</i>)	Ja	Fe	Ma	Ap	Ma	—	Ju	Au	Se	Oc	No	De
Blue Tit (<i>Parus caeruleus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Coal Tit (<i>Parus ater</i>)	Ja	Fe	Ma	Ap	Ma	—	Ju	Au	Se	Oc	No	De
Marsh Tit (<i>Parus palustris</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Long-tailed Tit (<i>Aegithalos caudatus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Nuthatch (<i>Sitta europaea</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Tree Creeper (<i>Certhia familiaris</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Wren (<i>Troglodytes troglodytes</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Dipper (<i>Cinclus cinclus</i>)	—	Fe	Ma	Ap	Ma	—	—	Au	—	—	—	—
Mistle Thrush (<i>Turdus viscivorus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Fieldfare (<i>Turdus pilaris</i>)	Ja	Fe	Ma	Ap	Ma	—	—	—	Oc	No	De	—
Song Thrush (<i>Turdus philomelos</i>)	—	Fe	Ma	Ap	Ma	Ju	Ju	Au	—	—	—	—
Redwing (<i>Turdus iliacus</i>)	Ja	Fe	Ma	—	—	—	—	—	—	Oc	—	De
Ring Ouzel (<i>Turdus torquatus</i>)	—	—	—	Ap	Ma	—	—	—	—	—	—	—

TABLE 2 (continued)

	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Blackbird (<i>Turdus merula</i>)	—	—	—	—	Ma	—	Ju	—	—	—	—	—
Wheatear (<i>Oenanthe oenanthe</i>)	—	—	—	—	—	—	—	Au	—	—	—	—
Whinchat (<i>Saxicola rubetra</i>)	—	—	—	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Redstart (<i>Phoenicurus phoenicurus</i>)	—	—	—	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Robin (<i>Erithacus rubecula</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Blackcap (<i>Sylvia atricapilla</i>)	—	—	—	—	Ma	—	Ju	—	—	Oc	—	—
Garden Warbler (<i>Sylvia borin</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Whitethroat (<i>Sylvia communis</i>)	—	—	—	—	Ma	—	Ju	—	—	—	—	—
Lesser Whitethroat (<i>Sylvia curruca</i>)	—	—	—	—	—	—	—	Au	—	—	—	—
Willow Warbler (<i>Phylloscopus trochilus</i>)	—	—	—	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Chiffchaff (<i>Phylloscopus collybita</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Wood Warbler (<i>Phylloscopus sibilatrix</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Goldcrest (<i>Regulus regulus</i>)	Ja	Fe	Ma	Ap	Ma	—	—	—	Oc	No	De	—
Spotted Flycatcher (<i>Muscicapa striata</i>)	—	—	—	—	—	—	Ju	Au	—	—	—	—
Pied Flycatcher (<i>Ficedula hypoleuca</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
Dunnock (<i>Prunella modularis</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Meadow Pipit (<i>Anthus pratensis</i>)	—	—	Ma	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Tree Pipit (<i>Anthus trivialis</i>)	—	—	—	Ap	Ma	—	—	—	—	—	—	—
Pied Wagtail (<i>Motacilla alba</i>)	—	—	Ma	Ap	Ma	Ju	Ju	—	Se	Oc	No	—
Grey Wagtail (<i>Motacilla cinerea</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Starling (<i>Sturnus vulgaris</i>)	Ja	Fe	Ma	Ap	Ma	Ju	—	—	Se	—	—	—
Greenfinch (<i>Carduelis chloris</i>)	Ja	—	Ma	Ap	—	Ju	Ju	Au	Se	—	No	De
Goldfinch (<i>Carduelis carduelis</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Linnet (<i>Carduelis cannabina</i>)	—	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	—	—	—
Redpoll (<i>Carduelis flammea</i>)	Ja	Fe	Ma	Ap	Ma	—	Ju	Au	Se	Oc	No	De
Bullfinch (<i>Pyrrhula pyrrhula</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Chaffinch (<i>Fringilla coelebs</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Brambling (<i>Fringilla montifringilla</i>)	Ja	—	—	—	—	—	—	—	—	—	—	—
Snow Bunting (<i>Plectrophenax nivalis</i>)	—	—	Ma	—	—	—	—	—	—	—	—	—
Yellowhammer (<i>Emberiza citrinella</i>)	Ja	Fe	Ma	Ap	Ma	—	Ju	—	—	—	—	—
Reed Bunting (<i>Emberiza schoeniclus</i>)	—	—	—	—	Ma	—	—	—	—	—	—	—
House Sparrow (<i>Passer domesticus</i>)	Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De
Tree Sparrow (<i>Passer montanus</i>)	Ja	—	—	—	Ma	Ju	—	—	—	—	—	—

No passage waders were recorded in or over Farndale in 1990. Five wader species were present: Golden Plover, Snipe and Curlew only in summer; Lapwing and Woodcock (Plate 3) the year round. All five breed annually. Gulls are rare in Farndale except in the spring and summer when Black-headed Gulls often fly high over the dale and groups of Common Gulls pass through. Either or both species may occasionally be seen feeding in grass fields in the dale.

Table 1 shows that the Woodpigeon was the fifth most frequently recorded species at Bee Stone in 1990. This is partly due to its large size, frequent flights and prolonged song season, but it is also one of Farndale's most abundant and characteristic birds. While the Woodpigeon appears to be resident the year round, the Stock Dove is at least partly absent in the winter months. There is a flourishing population of feral pigeons (Rock Doves *Columba livia*) in the dale spread between some half-dozen colonies in ruined buildings, but daily records of these were not kept in 1990. Some evidence from previous years points to interbreeding between feral pigeons and Stock Doves.



PLATE 2

The Farndale 'Red-legged Partridge', photographed here at Bee Stone, is a hybrid between the Red-legged Partridge and the Chukar.

Only two owl species were recorded in Farndale in 1990. The Tawny Owl (Plate 4) is a common breeding resident and was the ninth most frequently recorded species at Bee Stone. No evidence was found of breeding Barn Owls in 1990 though this species undoubtedly bred at least twice in Farndale in the 1980s.

In 1990 a pair of Kingfishers bred successfully in Farndale but this should perhaps be regarded as an unusual event. Time will show if the species breeds regularly, but the River Dove is not a typical Kingfisher river. Several pairs of Dippers (Plate 5) breed annually in Farndale though no nest was found in 1990.

Of the hirundines, the Swallow breeds abundantly and was recorded at Bee Stone virtually daily in May–August. The House Martin's Farndale distribution is much more local. In 1990 two small colonies were found, at Low Mill and on the Methodist chapel on the east side of the valley; each consisted of about six occupied nests. Only a few pairs of Swifts bred in the dale in 1990. Three or more pairs bred at High Mill, two pairs at Church Houses and a single pair at Lendersfield House, where an adult was flying in and out of the eaves, evidently feeding young, on the very late date of 18 August.

In spite of intensive keepering, which up to 1989 at least included putting down poison, evidently aimed at Magpies and Crows, Farndale's avifauna in 1990 featured five common corvids: Carrion Crow, Rook, Jackdaw, Magpie and Jay, all of them present throughout the year. The Rooks and Jackdaws, except when breeding, normally flew out of Farndale at dusk and roosted somewhere to the south in the Vale of Pickering, returning in the early morning. To judge from these flights, 50–100 Rooks and about 250 Jackdaws were visiting Farndale.



PLATE 3

Throughout Farndale roding Woodcocks are a familiar sight and sound from March to July. This bird is returning to its nest after an off-duty spell to feed, with earth still adhering to its bill.

While the Jackdaws breed throughout the dale in single pairs and small groups, mostly in holes in trees, the Rooks nest in the dale's only rookery located between Church Houses and Low Mill on the west side of the valley. During bad weather in the winter, especially mist, driving rain or snow, these Rooks and Jackdaws remain in the vale and do not visit Farndale at all. Thus at Bee Stone, where the Jackdaw was the sixth most often recorded bird, it was only recorded on half or two-thirds of the days of observation in December and January, while in February, March, September and October, it was recorded on virtually every day of observation (Table 1).

Five tit species were present throughout the year in 1990 in Farndale: Great, Blue, Coal, Marsh and Long-tailed. The first four of these regularly took nuts, sunflower seeds and fat put out for them at Bee Stone from October to March inclusive and visited the garden much less often in summer. Their relative abundance in the dale as a whole may well be reflected in their appearances at Bee Stone: as can be calculated from Table 1, Blue Tit was recorded on 93% of days of observation, Great Tit on 74%, Coal Tit on 65%, Marsh Tit on 52%. The same criterion would place the Nuthatch, also a regular bird-table feeder, between the Coal and Marsh Tits in relative abundance. The Tree Creeper and Long-tailed Tit only visited Bee Stone irregularly and never took food put out by us.

As one would expect, thrushes of the genus *Turdus* are well represented in Farndale. Table 2 shows that Mistle Thrush and Blackbird were present the year round; Fieldfare and Redwing were winter visitors and Ring Ouzel and Song Thrush summer visitors. The Song Thrush's status came as a surprise and may be somewhat exaggerated in Table 2, because in

earlier years single Song Thrushes had been seen in November and December. Some birds probably remain in the winter, but most of Farndale's Song Thrushes are absent then, returning in February–March, when they produce a chorus of song. The species breeds commonly throughout the dale. The Ring Ouzel is confined to the moorland fringe around the rim of the dale.



PLATE 4

Farndale is excellent Tawny Owl country. The only other owl recorded there in 1990 was a single Barn Owl.

In Farndale in 1990 the family Turdidae was also represented throughout the year by the Robin, which breeds in the lower wooded and agricultural parts of the dale. Table 1 shows that it was the fourth most commonly recorded species at Bee Stone in 1990. The Wheatear, Whinchat and Redstart all breed in the dale, though no proof of breeding was obtained in 1990 for Wheatear and Whinchat. Two pairs of Redstarts nested at Bee Stone in 1990, one in a hole in a barn wall, the other in a nestbox which contained 9 eggs on 20 May and 9 well-feathered young on 8 June.

The only abundant breeding warbler in Farndale is the Willow Warbler. As Table 2 shows, Blackcap, Garden Warbler, Whitethroat, Chiffchaff and Wood Warbler were all present in May. They advertised their presence by singing and all probably bred, though sparsely. Other soft-billed passersines recorded in Farndale in the summer months of 1990 were the common and widespread Spotted Flycatcher, the rather rare Pied Flycatcher, and Tree and Meadow Pipits. The Meadow Pipit may be present in small numbers in winter as well as summer, but was not recorded in January, February, October, November or December 1990 (Table 2). The same is perhaps true of the Pied Wagtail, seen at Bee Stone, where a pair raised two broods in

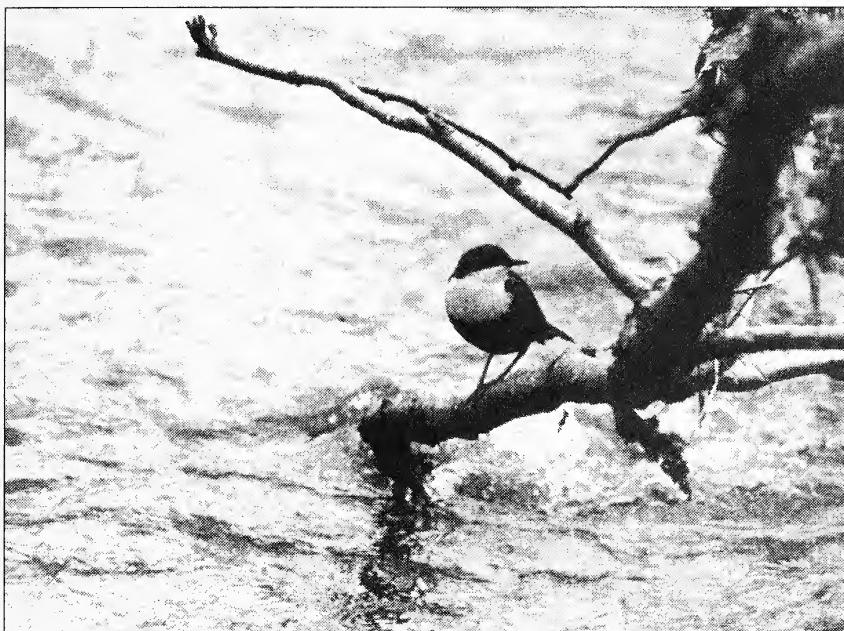


PLATE 5

This Dipper is perched on a branch above the River Dove in Farndale, where the species is resident throughout the year.

1990, in every month except January, February and December. On the other hand some Grey Wagtails remained in Farndale through the winter. The Starling's status in Farndale requires further investigation. In 1990, it appeared to be breeding fairly commonly but was not recorded in October, November or December. It may be only irregularly present in winter.

The thick-billed seed eaters make a big contribution to Farndale's avifauna. The Chaffinch was the most often recorded bird species at Bee Stone in 1990, being recorded on 95% of the days of observation there. Goldfinch, Redpoll and Bullfinch were each recorded in 11 or 12 months; Goldfinch being recorded on one-third of the days of observation and Bullfinch on more than half of them. The local Bullfinches appeared to be dependent on wild or Myrobalan plum (*Prunus cerasifera*) buds during the winter and early spring. Greenfinch and

Redpoll were present in all seasons but always sparsely distributed. The Linnet and Reed Bunting were recorded only in summer and neither was common. The Yellowhammer, common in the broad agricultural valley bottom, was missed, rather than absent, in the second half of the year (Table 2): it is a resident. Siskin, Snow Bunting and Brambling are uncommon winter visitors: the first of these was seen in November and December 1989 and January 1991, but not in 1990.

Last, but certainly not least in interest, come the sparrows. Though in the Pickering area, only a few miles away, the Tree Sparrow is a common bird, it has scarcely penetrated into Farndale, where our only 1990 records were of a single bird at or near Tenter Hill in January, May and June; perhaps a pair nested. The status of the House Sparrow came as a surprise. At Bee Stone it figured among the seven least recorded species, i.e. those seen once only during 1990. These seven rarities were Goosander, Merlin, Grey Partridge, Herring Gull, Barn Owl, Lesser Whitethroat and House Sparrow (Table 1). Although Table 2 shows that the House Sparrow was present in Farndale throughout the year in 1990, it is not at all abundant, being found at a few widely scattered working farms; a proportion of the sparrow population may leave the dale altogether in winter. A search in January and February revealed only three groups of House Sparrows in Farndale: at Tenter Hill, Church Houses and Toad Hole. In July–August 1990 there were thought to be nine or ten breeding colonies, each only numbering a few pairs. The typical farmyard passerine of Farndale is not the House Sparrow but the Chaffinch.

CONCLUSIONS

This pilot study based on a single year's observations shows that there is much to be learned about local avifaunas from regular round-the-year observations, especially in areas like Farndale which have natural geographical limits. Even the establishment of the ten most often recorded species in a particular area is a worthwhile exercise. At Bee Stone these ten, in order of frequency, were Chaffinch, Pheasant, Blue Tit, Robin, Woodpigeon, Jackdaw, Blackbird, Great Tit, Tawny Owl and Wren. Compare these with the ten most often recorded birds in rural gardens nationally in 1988–1989 as found by the British Trust for Ornithology's Garden Bird Survey (Muirhead 1990): Blackbird, Blue Tit, House Sparrow, Robin, Starling, Great Tit, Chaffinch, Dunnock, Greenfinch and Collared Dove.

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THE SUB-FOSSIL OCCURRENCE OF THE GREATER SILVER WATER-BEETLE *HYDROPHILUS PICEUS* (L.) (COL: HYDROPHILIIDAE) AT SHIRLEY POOL, SOUTH YORKSHIRE

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Shirley Pool Site of Special Scientific Interest (SE568119) is situated approximately 9 km north of Doncaster, near the mining village of Askern. It comprises alder carr woodland bordering a small lake formed by flooded peat cuttings. The site is of particular interest because of the alkaline nature of the water regime in a situation where an oligotrophic mire might be expected. This alkalinity is a result of run-off from the dipslope of the Magnesian limestone to the west. The high pH has led to the growth of the calciphile sword sedge *Cladium mariscus* (L.) Pohl. and the absence of acid bog plants. These unusual conditions led to the designation of the site in 1955.

Distinct vegetational zonation occurs around the pool, with derelict alder oak coppice growing on the uncut areas of peat. The area of former medieval peat-cutting has flooded to form a fishing pond approximately 300 m long and 75 m wide, fringed with *Phragmites* reed swamp. The woodland is adjacent to the Sutton Common Scheduled Ancient Monument (SE564121), a pair of Iron Age raised enclosures once separated by the now diverted Hampole Beck (Sydes & Symonds 1987). The proximity of archaeological remains to the peat deposits provides an excellent opportunity to study palaeoecological evidence for the landscape history and anthropogenic impact in the area. The pollen record from Shirley Pool (Ward 1988) shows expansion and contraction of carr woodland followed by the opening up and drying out of the area. This last phase is seen as a result of drainage and modern agricultural techniques.

As part of a project investigating woodland management history, using sub-fossil beetle remains as environmental indicators, a monolith was extracted from uncut peat 20 m from the edge of the lake. The peat sequence recovered showed episodic expansion and contraction of the water body. Lenses of unhumified *Phragmites* and *Carex* peat, formed in periods of higher water levels, were inter-bedded with more humified woody fen peats and root matter formed from vegetation growing *in situ* when the water body contracted and the peat surface became drier. The three samples analysed, from 120–126 cm, 87–90 cm and 0–5 cm, have yielded numerous well preserved beetle remains. The two lower (older) faunas, recovered from silty, poorly humified fen peats, are dominated by a clear eutrophic freshwater beetle component. These deposits formed when the water level was higher than present day and the sample site was submerged. Several of the species recovered from peat layers at 120–126 cm and 87–90 cm are now comparatively rare and currently enjoy far more restricted distributions than that which their fossil records display.

Fragments of the Greater Silver Water-beetle, *Hydrophilus piceus* (L.), were present in the sample, lying between 87 and 90 cm below the modern peat surface. Since this level cannot be dated by artefactual evidence and no radiocarbon dates have been obtained, the sample has been dated palynologically. The appearance of *Pinus* pollen immediately above sample 87–90 cm (Ward, 1988) is probably a result of planting when Owston Park was landscaped and planted by Humphrey Repton in 1790. The sample is therefore assigned to the early post-medieval period.

The enormous size of this species, as large as the stag beetle *Lucanus cervus* (L.), makes it unlikely that it has been overlooked by entomologists. Balfour-Browne (1958) reviews the evidence for the species decline from habitats around London, beginning in the mid-eighteenth century (Curtis 1862). Populations are still well established in the Somerset Levels where it has also been found as a fossil (Girling 1976), mid and west-Kent (Massee & Southwood 1962) and the Sussex marshes (Foster 1965). Although *H. piceus* has been

recorded from the Norfolk Broads, most of the recent captures are from the conserved area of Wicken Fen. Northerly mid-nineteenth century records come from Repton, Derbyshire and from near Huddersfield (Balfour-Browne 1958).

H. piceus has been found as a fossil at three other localities. An almost complete specimen was found in undated deposits from Hatfield Moors earlier this century. It is recorded from deposits in a ditch at the Iron Age fortifications at Stanwick, N. Yorkshire (Kimmings 1954) and from a Roman ditch in Oxfordshire (Robinson 1980).

Thus the fossil evidence and the old records from Repton and Huddersfield suggest that the species was once more widespread. The beetles' contraction in range could be attributed to urban development destroying suitable habitats, as is the case around London, infilling and drainage of ponds and eutrophication. Buckland (1979) argues that on the evidence of the older records the decline of the species commenced before these factors would have become more than locally significant. This pattern of decline has been noted for several other water beetles (Girling 1984a) and includes at least one national extinction, the whirligig beetle *Gyrinus colymbus* Er. (Girling, 1984b).

Climatic deterioration in the form of the Little Ice Age may have been a contributory factor in the earlier contraction of the beetles' range, compounded by later deleterious human activity. In the post-Little Ice Age period *H. piceus* may have been prevented from re-establishing itself in its potential thermal range as a result of habitat fragmentation and destruction. Buckland (1975) proposes a similar hypothesis to explain the present and past distribution of the Death-watch Beetle, *Xestobium rufovillosum* (Degeer). Given the apparent inability of *H. piceus* to recolonise suitable habitats in this country during the post-Little Ice Age climatic amelioration, Balfour-Browne's (1958) suggestion that the Somerset and south-east populations of *H. piceus* are products of recruitment from European populations seems unlikely.

The drying out of uppermost peat layers destroys insect remains and it is these deposits which would contain the information necessary to test this hypothesis. The loss of suitable medieval and post-medieval deposits and the acceleration of wetland drainage results in the destruction of a vital information source necessary for the conservation of species.

The case of the Greater Silver Water-beetle is by no means exceptional. The deposits yielded two other beetles with fossil distribution disjunct from that of the present day.

The ground beetle *Odacantha melanura* (L.) is now found no farther north than Norfolk (Luff 1982) and yet is present in the lower sample from Shirley Pool. In addition, *O. melanura* was present in early to mid-Holocene peat deposits from the river Calder near Methley, S. Yorkshire. The current expansion of the species in Scandinavia (Lindroth 1986) and in Britain (Eversham pers. comm.) must in some way be temperature-related, since its preferred habitat of clayey or muddy soil with rich tall vegetation is by no means restricted to the southern half of England.

The small Dytiscid *Bidessus unistriatus* (Schrank), a category one endangered species, has a still more southerly distribution and has only two recorded twentieth century breeding sites in Britain, both in East Anglia (Shirt 1987). Girling (1976) recovered several individuals of this species from peat beneath the Bronze Age Meare Heath trackway in the Somerset Levels. It is most likely to have been a victim of habitat destruction through fen drainage, disturbance and pollution.

Shirley Pool and the associated enclosures of Sutton Common have already been severely damaged by falling water levels, due in part to a series of dry summers but more significantly as a result of the extensive drainage of local farmland. If allowed to continue unchecked the remaining archaeology and a valuable repository of ecological information will simply dry up and turn to dust. The Shirley Pool peat record contains evidence for the demise of at least three beetle species. If the destruction of the site is allowed to continue it will surely contribute to the piecemeal extinction of many others. The irony is that without consulting the fossil record preserved in peat we may not realise a species is endangered until it becomes extinct.

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BOOK REVIEWS

The Handbook of British Mammals edited by Gordon B. Corbet and Stephen Harris. 3rd edition. Pp. xiv + 588, with numerous b/w photographs, line drawings and maps. Blackwell, 1991. £49.50.

This edition of the *Handbook* is of similar content to its predecessors in having short introductory chapters followed by systematic accounts appropriately occupying by far the larger section of the book. There are now also appendices on species that have become extinct in Britain since 10000 BP and on ephemeral introductions and escapes. A larger page size and two-column format facilitates the inclusion of much more material. This is essential if there is to be adequate coverage of the ever-growing knowledge on our mammals. This is well illustrated by the size of the bibliographies: in the first edition (1964) there were 661 references, in the second (1977) 1284 and in this edition 3186.

The introductory chapters are a great improvement in their content and coverage on those in the previous editions, with useful authoritative accounts of the history of the fauna, mammal

habitats and mammals and the law. In the systematic section each species is dealt with individually. Here information is given clearly and concisely with the editors, commendably, ensuring uniformity of presentation. This is achieved through the adoption of eighteen major categories, e.g. recognition, sign, measurements, social organisation and behaviour, feeding, population, relations with man etc. Contributors have kept their accounts succinct, making access to information remarkably easy. The species accounts are generally more informative than previously, with some groups given much more expansive treatment. For example, this is particularly evident in the Cetacea with here the enlarged text, supplemented with maps, indicating the location of the main concentrations and regional relative frequency of sightings, while as a result of recent research comprehensive data on the Ungulates is now presented, both in text and through illustration, on such topics as seasonal dietary changes, feeding activity and social behaviour.

The text is supplemented by numerous first class monochrome photographs, line drawings of animals and selected skulls, diagrams and distribution maps of ranges in the British Isles and throughout the world. The last are a considerable improvement on textual description of range. It is a pleasure to see the continued inclusion of many of Robert Gillmar's drawings of mammals although regrettable that his contribution is nowhere acknowledged. The inclusion of sources of sound recordings is a progressive step and a reflection of the new areas into which mammal study has evolved over the past two decades.

With such a vast literature to work from, it is obviously difficult for authors to provide both comprehensive and balanced accounts. Nevertheless, in looking critically into some species accounts there appear to be a few significant oversights. For example, no mention is made of Gibson's work on the altitudinal effects of breeding season duration on the bank vole, Dards' pioneering work on the social organisation and behaviour of urban feral cats is overlooked while the absence of measurements on at least some of the island races of the wood mouse (comparable data is given for the bank vole) leaves the reader unaware of how great size differences can be.

It is particularly pleasing to see an expansion of our knowledge of British mammals spread across all groups and species. To have incorporated so much data into one volume is to the credit of both editors and contributors. There can be no doubt that this will be a standard reference work on British mammals for many years to come.

MJD

In Spain's Secret Wilderness by Mike Tomkies. Pp. 240, with 32 colour plates. Jonathan Cape, 1989. £12.95

Mike Tomkies belongs firmly in the tradition of the rugged field naturalist, crouched for hours behind some bush to get just the right photograph of a rare bird or mammal. His dedication is tremendous and his ability to communicate his experiences and enthusiasm has led to a clutch of books, mostly concerning the wildlife around the remote Scottish loch where he lived alone for years. At intervals he swapped the Highlands for the wild places of Spain, no doubt on the basis that a change was as good as a rest. This is a blow by blow account of these visits. There is much detail of back-breaking climbs, knee-cracking descents and the aforesaid hours behind bushes. Vultures, eagles, owls and other special birds are present in variety, as are bears, wolves, lynx and other large mammals. You cannot beat direct observation of the daily lives of these animals for making them seem real and worth conserving, and this is where the author excels. There are numerous colour shots of the actual events described in the text.

Anyone who has travelled in Spain beyond the resorts will be aware of the rich potential for wildlife in the mountain ranges of the hinterland. Mike Tomkies has actually seen the animals we suspected (or were told) might be there. What an encouragement to go back and get stuck in behind a bush! I shall be booking my passage shortly.

SLS

THE DUCK LEECH *ATHEROMYZON TESSULATUM* (O. F. MULLER) IN CROSE MERE, SHROPSHIRE

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INTRODUCTION

The freshwater leech *Theromyzon tessulatum* (O. F. Müller) is the major leech parasite of waterfowl in Britain, the only other being *Haementeria costata* (O. F. Müller) which is found exclusively in lowland streams at Pevensey Levels in Sussex (Elliott *et al.* 1979).

T. tessulatum is widespread in Britain, and the only freshwater habitat from which it is absent is fast flowing streams. It is an egg-brooding leech, and carries its young for a time after they hatch (Elliott & Mann 1979). The host of *T. tessulatum* is varied, with twenty species of bird known to be parasited (Elliott & Tullett 1982). The leech can only attack and feed from soft tissues, and is often found feeding on the mucosa of the nasal cavity of birds after entering via the nares (Trauger & Bartonek 1977; McKinney & Derrickson 1979). It has also been observed feeding from beneath the nictitating membrane of the eye. The attacks can be fatal, with the cause of death either a haemorrhage or, more usually, asphyxiation caused by blocking the respiratory tract. *T. tessulatum* needs a minimum of three blood meals to mature (Herter 1929; Wilkialis & Davies 1980a).

The information presented in this paper was gathered during an ecological investigation of the free-living leeches of Crose Mere, a eutrophic lake in Shropshire (grid ref. SJ 430305). Only data on changes in numbers and weights of *T. tessulatum*, and whether the leeches were carrying young or not, were recorded. In the light of some interesting differences between the current data and those obtained from the three previous studies of the life cycle of *T. tessulatum*, it was thought that the information was worthy of publication.

METHODS

From April 1981 through to March 1983, *T. tessulatum* were sampled on seventeen occasions (see Fig. 1), using seed trays, 215 × 365 mm in size, filled with detritus, sand, gravel and small stones from the lake bed and subsequently buried in the substratum along the length of the littoral zone of the north shore of the lake (Spelling & Young 1987). After being left for about a month to allow colonization by invertebrates, the seed trays were returned to the laboratory, where the leeches were removed from the substrate, counted and weighed, and the occurrence of carried young noted. On each sampling occasion 16 trays were examined. Samples of leeches from stones were also taken at the same time as the seed trays were lifted. A month before the sampling programme began, stones were arranged in 16 rows, from the shore line to arms-length depth, and spaced along the length of the northern shore; the basal area of each row of stones was approximately equal at 0.1 m². Leeches were picked off the stones, placed in water-filled containers, and brought back to the laboratory, where they were counted, weighed and examined for carried young.

RESULTS

The life cycle of *Theromyzon tessulatum* extended over two years (Fig. 1). Young leeches were carried in the months of June and July. After release the mean weight of young increased in the autumn, remained constant over winter, and then increased in the following summer/autumn (Fig. 1a). The leeches then over-wintered at a constant mean weight before a final increase before breeding and subsequently dying in late summer/early autumn. The minimum and maximum weight recorded for leeches carrying young were 74 and 714 mg respectively.

For each cohort, there was a trend for biomass to peak shortly after the release of the young

Duck Leech in Crose Mere

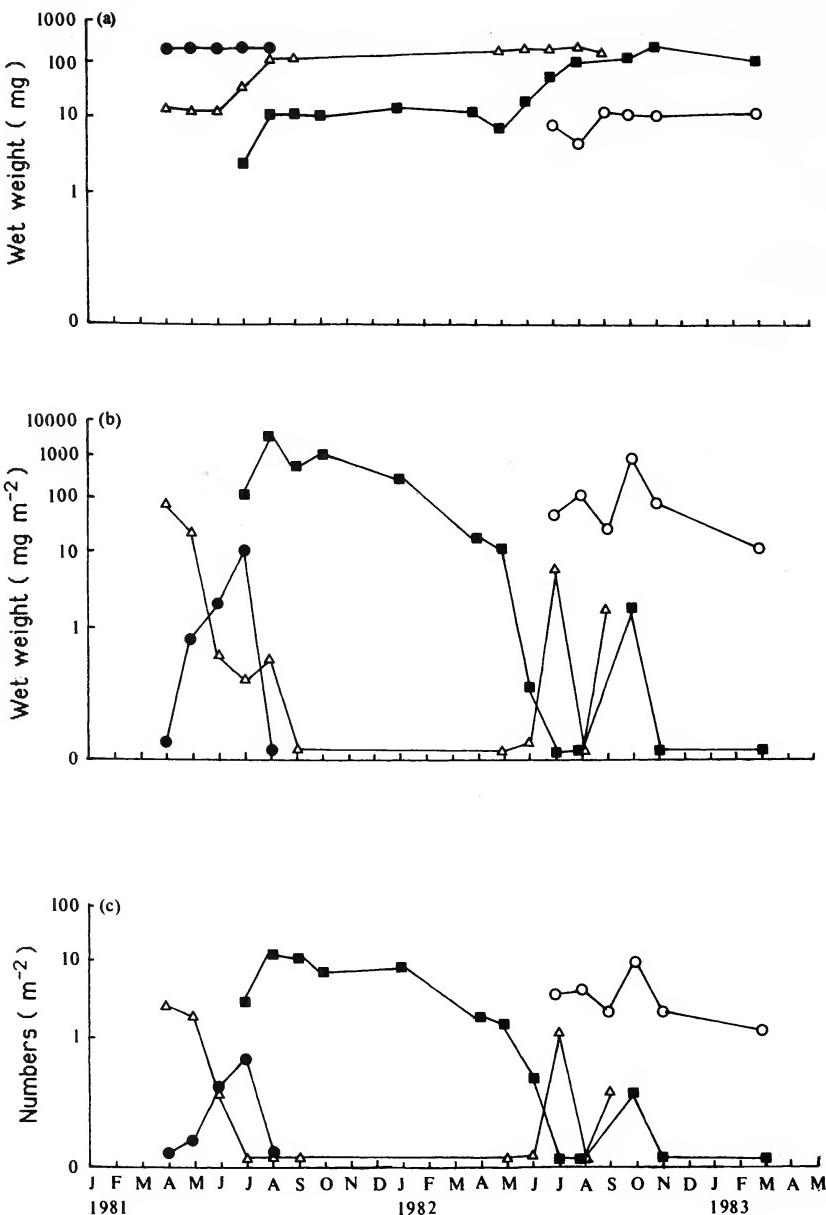


FIGURE 1

(a) Arithmetic mean individual weights, (b) geometric mean biomasses, and (c) geometric mean densities, for each cohort of *Theromyzon tessulatum*, from combined tray and stone data.

● 1979–81 cohort △ 1980–82 cohort ■ 1981–83 cohort ○ 1982–84 cohort

(Fig. 1b). Thereafter, values declined rapidly throughout the winter and then more slowly the following spring and early summer, to remain fairly constant, with the exception of slight increases in bulk the first and second summer/autumn of a cohort's two-year life span. The final increases reflected rises in the number of leeches detected in samples (Fig. 1c).

Seasonal changes in density (Fig. 1c) were similar to those described for biomass. Based on the numbers of free-living young obtained in samples, by the time leeches were one year old 64% of the population had died; at two years old 95% had died (Table 1), with total mortality occurring within the subsequent one or two months.

TABLE 1
Mortality data for the averaged cohort values from all years
Average maximum density (m⁻²)

(1) young leeches	13.2
(2) one-year-old leeches	4.8
(3) two-year-old leeches	0.7
% mortality between 1 and 2	64
% mortality between 2 and 3	86
% mortality between 1 and 3	95

DISCUSSION

The only previous studies of the life history of *Theromyzon tessulatum* are by Mann (1951), Wilkialis & Davies (1980a) and Elliott & Tullett (1982); the first and last were in Britain and the second in Poland. Mann found that the breeding season started with egg laying in June and July, and continued with the carrying of young from June to November. Elliott and Tullett found brooding leeches in June and July and young-carrying leeches from June to mid-October. Wilkialis and Davies found young carried from June to August. Elliott and Tullett also found that once released the young over-wintered as immature leeches, growing over the next summer, before over-wintering again; in the second summer, they were reproductively active. Elliott and Tullett also thought that some first-year leeches may have grown fast enough to breed in their first summer.

The current data supports the general two-year life cycle described by previous workers, but the breeding season in Crose Mere seems to be condensed. Adult leeches in the Crose Mere population appear to carry their young for a shorter time. The young were found to be carried only in June and July, and no adults were observed with young in August. The carrying of young in June and July is between one and four months less than recorded in previous studies. Wilkialis & Davies (1980b) found that the minimum weight of a breeding adult was 150 mg whilst in the present work an individual of only 74 mg was found breeding in Crose Mere in June 1982.

For each cohort, density and biomass increased in the summer of each year of its life (Fig. 1b, c), but particularly in its second year (e.g. 1980–82 cohort). This may be due to leeches moving up shore from deeper waters, not sampled by the trays and stones, into shallower water, so increasing the chance of adults and their young contacting a host to obtain a meal (Wilkalis & Davies 1980a). Interestingly, young-carrying *T. tessulatum* also showed a movement onto large stones in the autumn of their second year which may again have helped its released young to find a host.

Crose Mere experiences high summer water temperatures (Young & Ironmonger 1982a). Young & Ironmonger (1982b) found that the duration of both egg brooding/carrying and young carrying by the adult glossiphoniid leeches *Helobdella stagnalis* (L.) and *Glossiphonia complanata* (L.) was inversely related to temperature. It is tempting to speculate, therefore, that the thermal regime in Crose Mere during the breeding season of *T. tessulatum* may have been higher than in those other habitats studied by Mann (1951), Wilkialis & Davies (1980a) and Elliott & Tullett (1982).

SUMMARY

On seventeen occasions over two years, the leech *Theromyzon tessulatum* was sampled from stones and seed trays buried in the substratum on the littoral zone of Crose Mere, Shropshire. Changes in mean weight, biomass and density, and the incidence of young-carrying leeches, were recorded.

The leech has a two-year life cycle. Young are carried in June and July. For each cohort, density and biomass declined with time, with the exception of a slight increase in each summer/autumn, involving, perhaps, a movement of leeches into shallower water to contact a host. Sixty-four percent of released young died by the end of the first year. Differences between the current and the previous studies on the leech include a much shorter period for the carrying of young, perhaps a consequence of higher water temperatures in Crose Mere, and a much smaller mean weight for breeding leeches.

ACKNOWLEDGEMENTS

The authors are grateful to the Natural Environment Research Council for financial support, and to the owners and Nature Conservancy Council for permission to remove samples of leeches from Crose Mere.

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**NOTES ON YORKSHIRE MOLLUSCA 8:
HELICODISCUS SINGLEYANUS (PILSBRY, 1890) NEW TO YORKSHIRE**

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Leeds City Museums

Whilst examining the molluscan finds from flood debris collected from the east bank of the River Wharfe at a point just below Grass Woods, Grassington 34/985650). Dr C. R. C. Paul of Liverpool University found three dead shells of the small Endodontid, *Helicodiscus (Hebetodiscus) singleyanus* (Pilsbry, 1890). All three of the specimens still possessed their periostracum, and one of the shells was very fresh and translucent. The material was collected on 25 April 1987, but not recognised by Dr Paul until the specimens were re-sorted over the Christmas vacation in 1990. The specimens were then forwarded to the national recorder, Dr M. P. Kerney, who confirmed their identification.

Additionally, whilst investigating an infestation of ants in the greenhouses at Leeds University Experimental Gardens in Leeds in August 1987, I noticed a number of small snails which, on examination, turned out to be a mixture of *Zonitoides (Zonitoides) arboreus* (Say 1816) and *H. singleyanus* (Norris 1988). Both of these species are the first records for Yorkshire. Greenhouse records are, however, of little other than academic interest, as most of the species found in greenhouses do not escape into the wild. *Helicodiscus* is, however, known to occur both in the wild and in greenhouse situations in Britain and Europe.

The occurrence of this species at Grassington is of great interest, as it may well have become established in that area. In Europe it has been recorded from a variety of lowland habitats and it is known to be subterranean in habit (Kerney & Cameron, 1979). In Britain it was first recorded from an archaeological dig at La Bergerie, St Ouen, Jersey in 1974; woodland at Ynys-hir Hall near Machynlleth, Dyfed in September 1975; a yard at Dell Farm Field Centre, Whipsnade, Bedfordshire in May 1976 and in leaf litter in Kew Gardens in June 1976 (Chatfield 1977). Since the original discoveries it has been found in several other scattered sites throughout Britain, including Potton Church in Bedfordshire and Dr Paul's garden in Liverpool. This small but interesting species is very rare in Europe, and it is thought to have been introduced accidentally into the area from North America. It has recently been recorded, however, from Pleistocene deposits in Europe, but a great deal of doubt has been expressed over these finds. Living specimens are known to occur (and, indeed have been found on plant rootlets) several metres underground. Contamination of fossil deposits by subterranean snails is often overlooked or misinterpreted. Very little is known about this species in Europe, and we are not certain how it has been spread throughout the area. I would be interested to see any possible specimens of this small snail, together with any other snails found in greenhouses. *Helicodiscus* could be far more widespread within Britain than is known at present.

I would like to thank Dr C. R. C. Paul for allowing me access to his notes, and Dr M. P. Kerney for his information on recent records of this species in Britain.

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FIELD NOTES

A further Yorkshire locality for the water fern beetle, *Stenopelmus rufinasus* Gyll.

The weevil *Stenopelmus rufinasus* Gyll. was first reported in Yorkshire by Mr J. H. Flint when, in September 1978, he and Mrs Flint found the species in quantity in a pond near the River Derwent at Hemingborough (*Naturalist* 104: 112). This tiny weevil is associated with the water fern *Azolla filiculoides* Lam. and, like the fern, it is an introduction from North America.

In December 1990, Mr Tim Dixon drew to my attention a large quantity of water fern which had been pulled out of Pocklington Canal near Canal Head at SE/797468, and dumped in heaps by the side of the path. A quantity of the material was brought home on 20 December and on close examination it was found to contain large numbers of *S. rufinasus*. This constitutes the second known Yorkshire locality for this interesting insect, and no doubt future investigation will reveal its presence in other places on the Plain of York where the the water fern occurs.

Coleopterists may wish to know that some patience is needed when searching for the beetle because of its small size coupled with very sluggish movement, even if the material is being examined in a warm room.

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Cache prey of Tawny Owl

The ability of male owls to deliver several prey items in quick succession to an incubating or brooding female has often been ascribed to the greater hunting efficiency of certain males or to a concentration of easily caught prey. Observations on a pair of Tawny Owls *Strix aluco* in Bedfordshire indicate that the male had the rationale to cache prey, presumably in preparation for subsequent high demands.

While visiting nesting sites of Tawny Owls during the afternoon of 12 April 1990, a natural tree cavity used previously by them in 1989 was inspected and found to contain a roosting Tawny Owl and three freshly killed Starlings *Sturnus vulgaris*. A nesting box was in position 200 metres away from this natural site, having been placed there because of the poor structural condition of the tree, and on inspection a female Tawny Owl was flushed from three young, the eldest of which was estimated to be about eight days old.

Evening observations were made at this location from a position which permitted an unobstructed view of both sites. At 21.23 hours, the female began calling from within the nesting box; at 21.28 hours, a Tawny Owl, presumed to be the male, was seen to visit the natural site, to collect a prey item and deliver it to the nest box, where it was taken by the female. The male then flew directly back to the tree cavity and collected a second prey item, taking it to a nearby perch, and finally delivering it to the female when she called from within the box.

It may thus be concluded that timed observations of prey deliveries to a breeding site by the male may not be a true record of the time taken to catch the observed prey.

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Footnote:

John R. Mather comments that although the habit of caching prey items is well known (Philips W. R. 1948, *Birds of a Valley*, London; Walpole-Bond H. 1914, *Field Studies of some Rarer British Birds*, London), these observations are most interesting in that they record the retrieval procedure, not mentioned in *Birds of the Western Palearctic* Vol. IV.

OBITUARY

ALAN FREDERICK GORDON WALKER

1928–1991

The death of Alan Walker in February 1991 was a sad loss. A victim of polio at the age of 12, he was left with restricted mobility with which he had to come to terms. He showed great courage, and from the outset fought against the easy option of becoming dependent on others.

During the war years he relied on public transport to get to Gouthwaite Reservoir, where he spent hundreds of hours not only bird-watching but learning bird song, which he regarded as a complementary skill. He later acquired his own vehicle and was able to travel. He visited the Solway, Monk's House Bird Observatory (in the days of Eric Ennion) and later Islay which was to become his second love after Gouthwaite. He went abroad to Sardinia, northern Spain, America, Norway, the Gulf, and also Gibraltar on a number of occasions, where he was able to study and provide data on raptor migration over the Straits.



He joined the Yorkshire Naturalists' Union in 1947, the year of the foundation of the Harrogate and District Naturalists' Society. Encouraged by the Rev. K. Ilderton, a local ornithologist, he set about compiling the first check list of the birds of the H&DNS study area, which was to form the basis of all the Ornithological section reports he compiled as the Society's recorder until 1976. He set himself a high standard and his contributions to the VC64 recorders were always greatly appreciated. In 1960 he took on the VC Ornithological Recordership, but relinquished it after 3 years, mainly because of his increasing commitment to the British Trust for Ornithology.

He joined the BTO in 1950 and became a ringer in 1952. Over the years, Alan handled thousands of birds but was quick to recognise the scientific value of nestling ringing, which establishes the age and origin of each bird. In the late 1950s he embarked on two main projects: the ringing of wader chicks on the high ground around Harrogate, and the ringing of thrush pulli in Upper Nidderdale.

A total of 321 Lapwing chicks were ringed during the spring and summer of 1957 by a team of wader chick 'spotters' and catchers. The ringing of Blackbird and Song Thrush pulli produced enough recoveries to establish a pattern of winter movement of Song Thrushes south and west and even into the Iberian Peninsula, whereas Blackbirds were mainly leaving the high ground to winter at lower altitudes more locally.

Whilst basically rejecting the 'ring and fling' attitude to ringing, Alan was always eager to have a go at 'the big stuff'; and therefore, in 1956, after experimenting with a variety of methods to get moulting Canada Geese off the Lakes at Ripley Castle, near Harrogate (those were the pioneering years) a few were panned. This catch marked the beginning of Alan's enduring interest in the Canada Goose — in the species' moult migration to the Beaufort Firth, Inverness-shire, and later in founding the Canada Goose Study Group of Yorkshire. In 1970 'The moult migration of Yorkshire Canada Geese' was published in *Wildfowl* and he later wrote the chapter on Canada Geese in *Birds of Yorkshire* by J. R. Mather (1986).

He always enjoyed survey work and, as a result of the steady flow of data he sent in during the six years following his joining, the BTO appointed him the Regional Representative for West Yorkshire in 1956. He later served a term as a Council member (1973–1977). His enthusiasm for birds was such that he was able to motivate people into providing records for numerous surveys, including two major projects: the *Atlas of Breeding Birds* and the *Register of Ornithological Sites*. He had, since 1952, been organising the wildfowl counts for the Wildfowl Trust. In 1970, in recognition of his outstanding contribution to Ornithology, he was awarded the Bernard Tucker Medal by the BTO.

His contribution to the Harrogate and District Naturalists' Society was remarkable. He was a founder member, and President in 1958, 1959 and again in 1972, the Society's Jubilee Year. He produced two major publications: a booklet on Gouthwaite Reservoir and a 'Check list of the Birds of the Harrogate area' (1961), which ultimately covered a span of forty years. He edited the Harrogate and District Naturalists Society's Annual Report from 1963–1970, and was co-author of a paper 'Recoveries of birds ringed in the Harrogate area' in *The Naturalist* (1965).

Alan cared deeply about wild places and their birds. In the 1960s, with recreational pressures mounting, he feared for the future of Gouthwaite Reservoir and pressed for SSSI designation. When its protection as a nature reserve was assured it was fitting that, in 1978, he should be appointed Chairman of the Yorkshire Water Authority's Expert Committee, a position which he held until his death.

Alan loved birds. He would sit for hours watching birds bathe, preen, song-flight or nest, sometimes a mere bundle of feathers in a winter blizzard. He was sceptical about what he used to call 'Man's technical ingenuity' and its consequences for the natural world. He preferred to share his simple pleasures with others, infecting them with his own enthusiasm. He married in 1984, and after his retirement (he worked for Harrogate Borough Council and latterly the Regional Hospital Board) was able to enjoy longer holidays with Alison, and Branta, his black Labrador.

Many who learnt their bird-watching skills from him will remember him with gratitude. In spite of his difficulties he derived a great deal of satisfaction from his life, through putting so much into it.

MRS

Correction

The headings 'Aerial nests' and 'Soil nests' in Table 8 of *The Naturalist* 115: 135 (1990) should be reversed

**PHAONIA JAROSCHEWSKII SCHNABL (DIPTERA; MUSCIDAE), THE
'HAIRY CANARY'**

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The author's involvement in the identification of some one hundred thousand muscid flies over recent years from surveys in many parts of Britain, and from various museum and private collections, has highlighted many of the truly rare species. Where something of their ecological requirements is understood, strategies for their conservation can be formulated. This paper is concerned with one of our rarest muscids and one currently of particular relevance to Yorkshire, namely *Phaonia jaroschewskii* Schnabl. It is evident that this species can be used to assess the ecological integrity of the peat-bogs which it frequents in much the same way that canaries were used by colliers to test the safety of coalmines.

P. jaroschewskii, especially in the male sex, is unmistakable amongst British muscids in the exceptionally bristly hind tibiae which carry the strong near-posterodorsal bristle characteristic of the genus. It was the extremely hairy hind tibiae of this fly indeed which prompted Ringdahl to give it the name *P. crinipes* when he described it from Sweden in 1913. His name however sinks into synonymy since it has been shown that the species had already been named by Schnabl in 1888 on specimens taken in Kharkov by Jaroschevsky. The puparium of *P. jaroschewskii* is even more distinctive in the minute, highly characteristic anal spiracles and the unusually long and thick prospiracular processes. In this respect the only known muscid with a similar puparium is the North American *P. deleta* Stein (Skidmore 1985). Hennig (1955–64) and Zinoviev (1981) state that *P. siebecki* Schnabl & Dziedzicki, which ranges from Devon northwards to Allerthorpe Common (VC61) and eastwards to Lower Austria and Leningrad is the only palaearctic species closely related to *P. jaroschewskii*. The biology of *P. siebecki* is unknown, but it favours drier places than *P. jaroschewskii*, frequenting birch-clad heaths, and hence is less rare.

P. jaroschewskii is the lowland raised bog muscid par excellence; an international rarity whose world distribution, a very meagre scatter of isolated colonies, coincides very closely with that of lowland raised bogs. Polunin and Walters (1985) show that this was an exclusively north European vegetational type and essentially a feature of the Baltic region, but with extensions westwards into lowland England and eastwards across north-west Russia; today, as Caulfield (1991) shows most has been destroyed and even the remnant is everywhere under attack. Within its habitat *P. jaroschewskii* breeds in wet, active *Sphagnum* (Skidmore, 1985).

Insofar as the British status of *P. jaroschewskii* is concerned Fonseca (1968) gave only three British localities (i.e. New Forest, Hants., Whixall Moss, Flints. and Skipwith Common, Yorks.), whilst the huge amount of collecting and subsequent surveys throughout the British Isles have added only two further sites (i.e. Arne, Dorset and Thorne Moor, Yorks.). Currently known only from Thorne Moors it is classed by the Nature Conservancy Council as an RDB 2 species in Britain. Recent work on Thorne Moors shows clearly that such is the fly's vulnerability that its continued presence in the other recorded localities listed above cannot be assumed; continual monitoring is essential. A recent intensive survey of peatlands throughout Wales, which included the Flintshire part of Whixall Moss, failed to reveal its presence there, but the exact location near Bettisfield where it was taken by Wainwright in 1938, was destroyed by peat-extraction during the 1970s. Unprecedented collecting by dipterists in the New Forest and the Dorset heaths has failed to rediscover it, and the area of Skipwith Common where it was taken has now totally changed.

In July 1985 random sweeping over much of the National Nature Reserve on Thorne Moors revealed that *P. jaroschewskii* was the most abundant muscid, and when in 1987 W. A. Taylor, the NCC Warden, ran a Malaise Trap there, this was again found to be the case. During late 1988 and through 1989 a system of very deep drains was dug by Fisons beside the National

Nature Reserve and in 1990 the water-table on the reserve reached the lowest level ever known. Fortunately, it was also during 1990 that the most intensive entomological survey ever carried out there was organised (Heaver & Eversham, 1991). The largest number of muscids taken in any single sector in this survey came from the reserve, and this figure greatly exceeded that taken in 1987. But there were far fewer species present in 1990, and *P. jaroschewskii* was totally absent! In fact most of the muscids from the reserve in 1990 belonged to our commonest British species, *Helina evecta*, which is tolerant of the driest conditions and could not breed in the inundated regimes required by *P. jaroschewskii*. The 1990 results in fact very strongly indicate that the lowering of the water table across the reserve had wiped out the international rarity *P. jaroschewskii* from that part of the moors.

During 1990 *P. jaroschewskii* maintained a good foothold in three other isolated parts of Thorne Moor where an adequate water-table had remained despite the extended drought, and some tree cover gave insulation against excessive evaporation. However the huge population crash on the National Nature Reserve, occurring in less than three years, demonstrates that population size is no guarantee for survival in the face of habitat change. It also underlines the absolute necessity of continual monitoring.

Lest it be argued that it was the drought of 1990 alone which caused the demise of *P. jaroschewskii* on Thorne Moor NNR, it is merely necessary to recall that populations of peat-pool species showed no decline on the NNR, during the long 1976 drought. Also, as stated above, *P. jaroschewskii* occurred elsewhere on the moors in 1990, invalidating any attempt at a climatic explanation and any suggestion that different trapping methods caused the disparity in results. Lowland raised bogs in areas of low rainfall, such as Thorne Moors, have always faced the hazards of droughts, and a study of climatic records over the past centuries show how frequently these have occurred. However, provided a high water table is maintained by the living bog surface, the deleterious effects of droughts are minimised, and even the most hygrophilous members of the mire ecosystem can survive these difficult periods.

The implications from the changing fortunes of the 'Hairy Canary' on Thorne Moors are clear. An actively growing bog surface is vital for the survival of this international rarity in what is to the best of our knowledge, its only remaining British locality. If strong populations can be maintained on other parts of Thorne Moor, re-colonisation of the National Nature Reserve may be possible when the water-table across the reserve is restored to the optimum level. The evidence suggests that *P. jaroschewskii* may survive on two of the sectors adjoining the reserve, but only in very small numbers.

If a widespread arrest of declining water tables is initiated now as a matter of urgency, and high levels restored to most of the moor, it may be possible to save the 'Hairy Canary' on Thorne Moor, along with many other peat-pool species. However it seems most unlikely that this will be done, since according to Caulfield (1991), the peat-extraction company has incurred huge expenditure on new drainage works, and even road-building, across Thorne Moors in preparation for a massive increase in peat removal. This has now become possible through technological innovations introduced from abroad, whereby vast areas of peat-bog can be removed simultaneously by the surface-milling system. This alien technique appears to have been pioneered in Finland but has been used widely elsewhere with disastrous results on peat-bog flora and fauna throughout the entire distributional range of this globally rare habitat type. Caulfield (1991) quotes the company's Thorne Moor manager, whom she interviewed in the latter half of 1990, as saying 'Fisons were about the last to adopt surface-milling. If we had been earlier we might not have had a problem about Thorne Moors, because it wouldn't be worth fighting for'. Doubtless an honest comment, but not one which inspires confidence in the future ecological integrity of the moor!

Clearly, faced with the draining of most of the moors, followed by the wholesale habitat destruction planned, the retention of a viable peat-bog invertebrate community on Thorne Moors is exceedingly remote. The entire ecosystem of which the 'Hairy Canary' is a particularly vulnerable member, is now wholly at the mercy of Fisons Horticultural Plc. Atkins (1991), an adviser to the company, recognising the irrevocable damage done by peat-harvesting to this ecosystem, by removal of surface vegetation and drainage operations, urges

continuous pressure on manufacturers to produce alternatives. Echoing these sentiments, we leave the last word to Prince Charles: 'If we would like other countries to stop regarding their rain-forests as useless jungles, we would do well to set an example by not treating our peatland habitats as useless bog to be drained, dug up and scattered about in our gardens'.

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BOOK REVIEWS

Soils and Micromorphology in Archaeology by M. A. County, P. Goldberg and R. Macphail. Pp. xx + 344, including many b/w plates, line drawings & tables, plus 8 pp. of colour plates. Cambridge University Press, Cambridge. 1989. £40.00.

Classical archaeology is about digging and digging is about shifting soil to reveal artifacts and constructional remains for scrutiny and measurement. A welcome development in recent years is the realisation that soil itself has a story to tell for those who can read the hidden text. Evidence gleaned from soil analysis deepens archaeological understanding. This book is about one way in which the soil record can be read, namely through its micromorphology. For the chemist soil is a most intriguing set of highly reactive interfaces. The ecologist sees soil as the medium in which plants spread their roots and from which they derive their nourishment. But for the pedologist soil is to be interpreted in terms of the nature and arrangement of both visible and microscopic structures in the undisturbed soil as it forms and evolves in the landscape. Micromorphology deals with the study of thin sections of undisturbed soil, usually using a petrological microscope. Descriptions of the organisation of soil minerals and the natures of thin films and concretions as seen in plain and polarised light have added much to the understanding of pedogenesis. Optical microscopy is now powerfully complemented by new techniques such as scanning electron microscopy. It is a welcome development to see these applied to soils and sediments from archaeological sites.

After some introductory pages the first main contribution in Part I (Basic Principles) covers fundamental concepts in soil science and current methods. This is a conventional treatment of soil genesis and profile description. I do wish, however, that authors would have the courage of their convictions and drop all references to zonal and azonal soils, concepts which are not only obsolete but positively misleading. The second half of the chapter describes methods of soil analysis, albeit in a very condensed form. Field methodologies and soil sampling are described next, followed by a comprehensive account of the microscopic approach.

The second part of the book has to do with 'Processes and Features' starting with sediments, their nature, formation and transportation. The material or anthropogenic features

in soils and sediments is full as one would expect in a book of this kind. Post-depositional processes are also described in great detail.

The final part comprises a number of case studies. Micromorphology of sediments from the Cave of Vaufrey in Perigord, France established a relative chronology of events which would have been impossible using more conventional approaches. Similarly, other studies in Israel and Morocco have also provided new interpretations of chronologies. The remaining cases were from open-air sites. One project in the Golan Heights allowed a differentiation of apparently uniform red sediments while another in the Jordan Valley led to a fuller understanding of the nature of building materials and occupational surfaces.

This is a fascinating book. It is well produced with many good plates and figures. There is a comprehensive reference list. I can confidently recommend it to all pedologists and archaeologists.

BED

Grasshoppers and Allied Insects of Great Britain and Ireland by Judith A. Marshall and E. C. M. Haes. Pp. 252, with 55 text figures and 12 colour plates. Harley Books, Colchester. Revised Version 1990. £15.95.

We welcome the publication of this 'soft-back' edition of the superb Harley Monograph under the above title, the first edition of which was reviewed in *The Naturalist* in 1988 (p. 140). A small number of corrections to the 1988 edition are included in the one here under review, along with some additional distributional data arising from more recent research.

The greatly reduced price should guarantee the work a wider sale and with the expanding enthusiasm amongst wildlife photographers for our more conspicuous insects, we would expect this book should prove a well-deserved success for the publishers. A valuable feature which this book shares with many currently being produced on other entomological subjects is that it is equally instructive to beginner and seasoned specialist alike. The new recruit with no prior knowledge of entomology is transported through the subject with consummate ease to the frontiers of our knowledge of the subject. One will quickly learn to distinguish the species, and with an accompanying tape can even learn to recognise them by their calls!

A walk in the country will gain yet another fascinating dimension.

PS

Poplars of the British Isles by Theresa Brendell. Pp. 24 with 29 colour plates. Shire Publications, Princes Risborough. 1990. £1.95.

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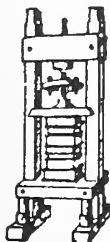
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2853

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The Birds around Malham Tarn — *A. J. Clunas and B. Shorrock*

**Two rare Scuttle Flies (Diptera, Phoridae) from Yorkshire,
including one new for Britain** — *R. H. L. Disney*

**Population changes in three butterfly species in North
Lancashire 1979–1990** — *John Wilson*

Recent Cetacean records from Yorkshire waters —
C. A. Howes

Coleoptera records for Yorkshire: a review and update —
R. J. Marsh

**The G. B. Walsh Collection of *Meligethes* Stephens
(Coleoptera: Nitidulidae), with notes on published
records** — *A. H. Kirk-Spriggs*

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To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record his deep appreciation of this imaginative gesture.

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THE BIRDS AROUND MALHAM TARN

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and

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7 East View, Settle

INTRODUCTION

This paper updates the excellent 'The Birds of Malham Moor' (1960) by Paul Holmes, the first warden of the Malham Tarn Field Centre. He had a long association with the area and had an intimate knowledge of its birds.

The total number of species recorded is 179. Forty new species have been added to the original list published by Holmes. These additions are given in Appendix 1 together with the first recorded date. A total of 91 species are known to have bred with 72 species currently breeding. We hope that the paper will encourage others to add to our knowledge of the birds of this area. There is still a great deal to learn.

The area covered by the paper is 4440 hectares (*c.* 44 km²), being the parish of Malham Moor and a part of the parish of Malham (Figure 1). Grassland is the most widespread habitat, ranging from calcareous to acid; open water is represented by Malham Tarn and Fountains Fell Tarn; the streams include Darnbrook Beck, Cowside Beck, the upper reaches of Gordale Beck and the inflow and outflow of the Malham Tarn; mires are represented by Tarn Moss, a raised bog, Tarn Fen, Ha Mire and Great Close Mire, together with calcareous mires and numerous wet flush areas where springs emerge from the bedrock; the largest woodland is Tarn Woods with other smaller plantations around farmhouses and at Darnbrook farm. The plantations at Darnbrook covering 42 hectares and planted between 1974 and 1980, have created a new habitat in otherwise open moorland and have been colonised by willow warbler, linnet, and whinchat.

The predominant land use is stock farming, but parts of Fountains Fell are maintained for grouse shooting, and a small area around the Tarn which is a nature reserve owned by the National Trust and managed jointly by the National Trust and the Field Studies Council.

The main changes that effect birds, particularly the breeding birds, are an increase in the number of visitors and an increase in the number of students visiting Malham Tarn Field Centre. It is also likely that the arrival of mink in the area has had an adverse affect on breeding birds. Species which have shown a marked change in status since 1960 are given in Appendix 2.

Undoubtedly the most potent regulator of birdlife in the study area will always be the winter weather, when severe spells can wipe out populations and it may take some years before recolonisation occurs, particularly by the more the sedentary species.

A list of earliest and latest dates for summer visitors is given in Appendix 3.

SYSTEMATIC LIST

The systematic list follows K.H. Vouos, *List of Recent Holarctic Bird Species* (1973 and 1977). Each species has been given a status as follows:

Very rare	recorded 1–5 occasions
Rare	recorded 6–20 times
Scarce	1–4 recorded almost annually
Uncommon	5–20 recorded annually on a few occasions
Common	20+ recorded annually
B	breeding proven
(B)	irregular breeder
FB	formerly bred

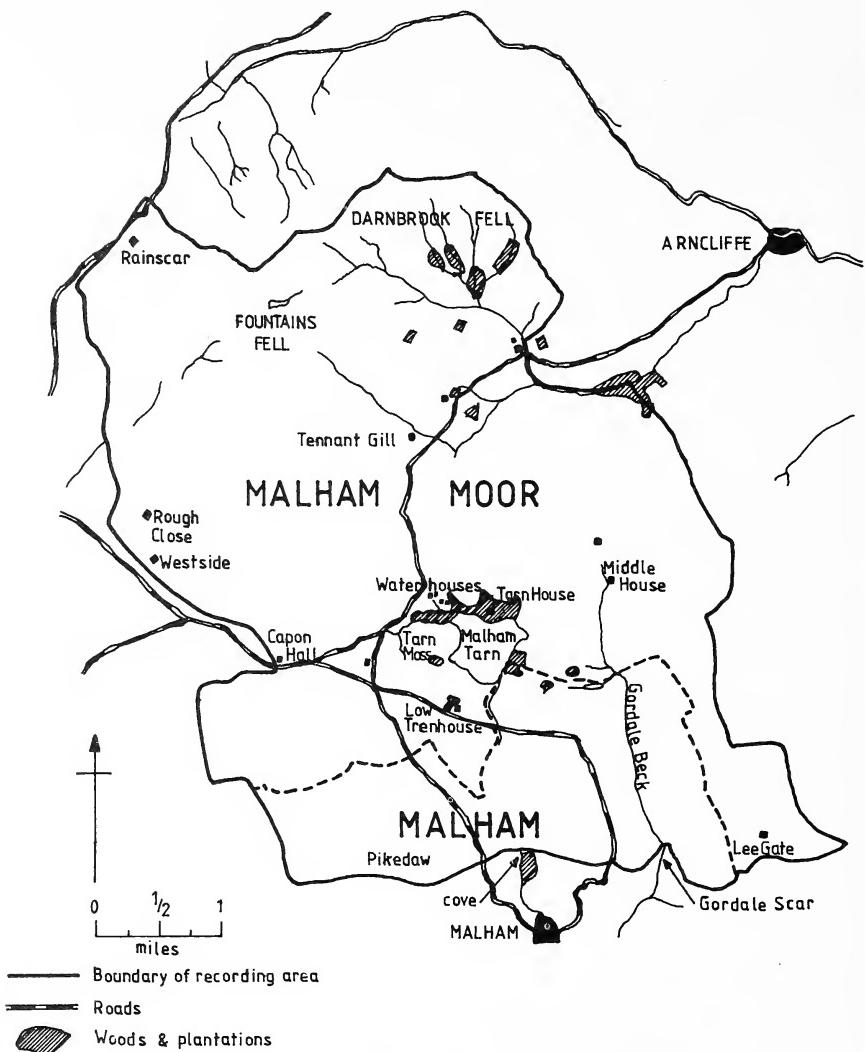


FIGURE 1
Study area

Sp	Spring
Su	Summer
Au	Autumn
W	Winter

(A season in parenthesis indicates that the species is less common at that time.)

Y	recorded throughout the year
Esc	escape or likely escape
f.	female
m.	male
imm.	immature
juv.	juvenile
pr	pair

OBSERVERS

DB	D. Bremner	PM	P. Mawby	FR	F. Roberts
RB	R. Brown	IM	I. Mercer	BS	B. Shorrock
AC	A. Clunas	KM	K. Moir	MT	Mr & Mrs Tullock
PC	P. Croft	HM	H. & S. Musher	PW	P. Wilkinson
PH	P. Holmes	CP	C. Poulson	TW	T. Williams
EJ	E. Jackson	SR	S. Ralph		

SPECIES ACCOUNTS

Red-throated Diver (<i>Gavia stellata</i>)	Very rare
One on Tarn in 1907 but no date given (Nelson, 1907). One on Tarn still showing traces of breeding plumage on 24/12/66 (DB, BS).	
Little Grebe (<i>Tachybaptus ruficollis</i>)	Common (B) Sp Su Au (W)
Breeding at the Tarn in 1896 (Peake, 1896). 1 pr breeding up to 1960 (Holmes, 1960). BTO Census 4 prs 1966, 2 prs 1977, then 1 pr irregularly to end of 1990. Maximum numbers present Aug–Oct. Some notable counts as follows: 27 on 14/10/72, 20 on 6/10/73, 18 on 11/10/74, 18 on 2/9/75, 20 on 16/9/77, 17 on 11/10/78. These have not been matched in recent years, e.g. maximum 4 on 23/10/89. 1–2 birds winter around inflow stream most years.	
Great Crested Grebe (<i>Podiceps cristatus</i>)	Common B Sp Su Au (W)
First pr bred on Tarn in 1921 (Booth, 1933) but E. Peake (1896) saw a single bird there on 7 June 1895. 6 to 8 prs attempt to breed annually. Arriving Feb–Mar, departing Sept–Oct. In most years one or two birds attempt to winter.	
Red-necked Grebe (<i>Podiceps grisegena</i>)	Very rare
One on Tarn 23–30/3/79 (EJ et al.). One there 24/7–26/8/89 in breeding plumage when first seen (BS).	
Slavonian Grebe (<i>Podiceps auritus</i>)	Very rare
1 on Tarn 10/9/48 (Chislett, 1949).	
Black-necked Grebe (<i>Podiceps nigricollis</i>)	Very rare
1 adult with traces of breeding plumage on Tarn 23/12/49 (PH).	
Gannet (<i>Sula bassana</i>)	Very rare
1 on Tarn 30/3/58, after a foggy night, seen diving at fish (PH).	
Cormorant (<i>Phalacrocorax carbo</i>)	Rare Y
Only ten records but becoming a more frequent visitor: 2 on the Tarn 1/6/48, one 6–10/9/50 (PH) and single birds 25/5/77, 26/4/81, 1/4/87, 6 on 12/4/87 and 1 on 28/9/87, 1 on 9/4/89 and 21/8/89, 2 on 6/5/90.	

Bittern (<i>Botaurus stellaris</i>)	Very rare
1 on Malham Tarn Fen 30/11/85 (PW <i>et al.</i>).	
Grey Heron (<i>Ardea cinerea</i>)	Common Y
1–3 birds recorded in all months, but most frequent in autumn. Herons do not breed within the area, the nearest colony being near Hellifield.	
Flamingo (<i>Phoenicopterus sp.</i>)	Very rare Esc
3 birds, obvious escapes at the Tarn outflow on 29/7/78 (EJ).	
Mute Swan (<i>Cygnus olor</i>)	FB Very rare
9 were introduced to the Tarn in 1928, these survived until Jan 1949 when the last remaining bird died. There were no more records until 2 appeared on the Tarn Nov 1984, these wintered before departing in Apr 1985. 1 imm. on 30/6–1/7/87.	
Bewick's Swan (<i>Cygnus columbianus</i>)	Very rare
All on Tarn, 14 on 15/3/56, 3 on 30/11/78 and 14 on 6/11/80.	
Whooper Swan (<i>Cygnus cygnus</i>)	Scarce W Sp
Birds recorded almost annually but rarely staying more than a day and in many cases only a few hours. Peak months Oct–Nov and Mar–Apr. More notable flocks have been, 25 on 7/1/50, 32 on 20/3/50, and 27 on 1/4/82.	
Pink-footed Goose (<i>Anser brachyrhynchus</i>)	Scarce W
Recorded most winters, mainly skeins flying over from Oct to Feb. The maximum count was 80 SW over the Tarn on 19/11/79.	
Greylag Goose (<i>Anser anser</i>)	Very rare W Sp
Single birds on Tarn 17/1/71, 29/3/84 and 17/4/87.	
Canada Goose (<i>Branta canadensis</i>)	Scarce
Small numbers recorded annually. A pr was seen near the Tarn for a few weeks in the spring of 1977–1980 but they did not breed. Notable records are 11 on 3/5/76, 5 on 29/3/77, 7 on 4/4/88 and 16 on 5/6/82 with a maximum of 30 on 8/6/89.	
Barnacle Goose (<i>Branta leucopsis</i>)	Very rare
One on Tarn 14/10/71 and 2 circled there on 7/5/84, eventually leaving in a northerly direction.	
Shelduck (<i>Tadorna tadorna</i>)	Scarce
Sixteen records, all from the Tarn as follows: 1 on 22/9/48, 1 possibly feral bird 14 Aug to early Dec 1976, 13 on 4/5/78 and 5 on 12/10/78, 2 on 12/2/80 and 3 on 6/5/80, 3 on 13/5/82, 2 on 28/4/83 and one on 7/5/85, 3 on 21/10/87, pr flying N over Waterhouses on 29/10/87 and 1 on 4/11/87, 3 on 17/3/89, 20 on 11/8/89, 7 on 22/9/89 and 1 on 18–19/11/89.	
Wood Duck (<i>Aix sponsa</i>)	Very rare Esc
One m. on Tarn 23/5/89 (BS).	
Wigeon (<i>Anas penelope</i>)	Common FB Au W Sp
Regular winter visitor in small numbers, maximum 60 on 14/9/49. Earliest arrival date 27/8/89, the area is vacated during hard weather, with the birds reappearing from Feb–Apr latest date 3/5/87. An adult with young on the Tarn in 1901 is the only breeding record (Nelson, 1907). Prior to 1970 30–50 birds were seen on the Tarn, now much scarcer, recent records are of 10–30.	
Gadwall (<i>Anas strepera</i>)	Very rare
Pr on the Tarn 11/5/82 with 1 m. and 2 f. there on 2/1/85.	
Teal (<i>Anas crecca</i>)	Common B Y esp W
Two or 3 prs breed annually around the Tarn, with 1 pr on Fountains Fell Tarn 640 metres above sea level. Small numbers are present during the winter months, an exceptionally high count was 70 on the Tarn 27 Nov 1985. One ringing recovery shows the continental origin of the wintering birds — a first year bird ringed in Holland Sept 1961 was recovered at Malham	

Tarn 23/10/62. Teal ringed as young appear to leave their natal area. Out of five young birds ringed on Malham Moor on 29/6/52, four had been recovered before the year end. One at Bewholme, East Riding in Aug; one at Bootle, Cumberland, in Oct; one in County Cork in Aug; and one in County Antrim in Nov (Mather, 1986).

Mallard (*Anas platyrhynchos*) Common B Y esp W
At least 10 prs breed annually (11 broods on 18/6/87). The resident population is boosted by winter visitors. Peak count of 98 birds on 26/10/70, more usually 20–60.

Pintail (*Anas acuta*) Very rare
Five records from the Tarn, 1 m. on 25 Sept 1959, 1 m. on 29/3/74, 2 on 7/10/78 and 2 on 28/8/83, 9 on 31/8/88.

Shoveler (*Anas clypeata*) Formerly common, now scarce FB
Up to 1963 an irregular winter visitor in small numbers late Sept to Dec, occasional in spring. In 1963 a pr bred for the first time, with 5 prs by 1966. This situation continued until 1976 when breeding ceased. During this period a flock of 50 to 60 birds gathered on the Tarn from Aug to Nov, maximum 78 in Oct 1971. When breeding ceased, autumn numbers dropped and recently no more than 10 birds have been recorded. A few birds still appear irregularly and a pr again bred in 1981. The only recent sightings being 7 on 31/8/88, 1 on 26/7/89 and 1 on 12/10/90.

Red-crested Pochard (*Netta rufina*) Rare
Single m. on the Tarn 12 and 16/11/72, 27/10/73 and 24/12/73, and 13/1/74 with a f. there from 28 Aug to 11 Oct 1983, one f. imm. on 26/7/89.

Pochard (*Aythya ferina*) Common FB AU W Sp (Su)
Recorded as breeding (Peake 1896) and since then it bred in 1906 and 1971. Regular winter visitor in good numbers, with a majority of m. at all times. Maximum count in Holmes (1960) was 105 on 11/12/49, exceeded in the 70s and early 80s with 365 present 30/12/72, 214 in 17/1/73, 235 on 20/12/75, 230 on 3/1/76, and 209 on 23/12/83. The normal maxima in recent winters were 60 on 21/2/88 and 78 on 14/2/89. During the winter of 1989/90 exceptional numbers were present Oct 115, Nov 230, Dec 153, Jan 458, Feb 480, and Mar 168.

Ring-necked Duck (*Aythya collaris*) Very rare
One m. on the Tarn on 13/1/90 (KM).

Tufted Duck (*Aythya fuligula*) Common B Y esp W
Probably first bred 1895, 12 prs in 1966 BTO Census, with 4–6 prs at the present time but few successful broods noted in recent years (1 brood 1989, none in 1990). Influx of m. late Jun early Jul, with numbers peaking Aug–Oct and Jan–Feb. More notable counts have been 237 on 19/8/72, 160 on 6/8/77 and 150 on 31/10/84. c.100 present in mid winter when the Tarn is ice free.

Scaup (*Aythya marila*) Rare
Single birds on Tarn 28/10/51, 25/10/53, 11/10/55, 16/4/54 and 2 on 7/6/54, 1 on 6 May–4 Jun 1983 and 2 on 8/8/87.

Common Scoter (*Melanitta nigra*) Rare
Thirty six on 5/9/54, 30 on 10/10/57, 6 on 17/6/58 and one 25–28/4/77, 8 on 3/11/87, 9 on 2/12/87, and 12 on 13/7/90 all records from the Tarn.

Goldeneye (*Bucephala clangula*) Common Y esp W
Regular winter visitor in small numbers Oct to Apr. Maximum 17 on 22/12/79 and 3/11/86. In recent years one or two birds have been recorded during the summer months, possibly birds from the expanding Scottish population. One m. 18/6/60.

Smew (*Mergus albellus*) Rare
Ten records from the Tarn as follows: 2 f. 21/2/50, pr 23/1/51, one m. 7 and 17/3/53, one m. 16–18/4/54, 3 on 22/1/56, 1 on 25–26/2/61, 2 f. on 18/12/63, one f. on 17/2/74, one redhead 2–3/11/86 and one redhead 15/3–17/4/87.

Red-breasted Merganser (<i>Mergus serrator</i>)	Rare
Three redheads 17/10/74, one f. 24/2-27/3/75, pr on 24/5/75, pr on 28/4/78 and two m. on 28/5/83, one on 28/10/87 and single f./j. on 13/11/87, 22/9/89, 2/9/90 and 12/1/91 all on the Tarn.	
Goosander (<i>Mergus merganser</i>)	Common (B?) Y esp Sp
Present on the Tarn throughout the year, with peak numbers in early spring. Maximum counts are 30 on 20/3/50, 40 on 10/2/60, 29 on 1/4/80 and 40 on 6/3/81.	
Ruddy Duck (<i>Oxyura jamaicensis</i>)	Very rare
Three records from the Tarn, imm. on the 1-3/10/84 (TW <i>et al.</i>), and f./imm. on 29/8 and 4/11/90 (BS, AC).	
Hen Harrier (<i>Circus cyaneus</i>)	Scarce Au W Sp
Single birds, usually ringtails appear almost annually Sept to May but a few occur outside this period 1 m. 9/6/70, 1 ringtail 10-18/8/71, 1 ringtail 23/7/75, 1 m. Tarn Moss 16/7/76.	
Montagu's Harrier (<i>Circus pygargus</i>)	Very rare
A ringtail near the Tarn 23-30/8/68.	
Goshawk (<i>Accipiter gentilis</i>)	Very rare
Single birds Tarn Woods 13/10/82 (TW) and 18/8/84 (SR).	
Sparrowhawk (<i>Accipiter nisus</i>)	Common B Y
This species returned to Tarn Woods in 1970 after a gap of 17 years, with the last breeding record in 1953. One resident pr now breeds annually, with a marked increase during Sept and Oct.	
Buzzard (<i>Buteo buteo</i>)	Scarce (Sp) Au (W)
In most years single birds are seen, usually in autumn, with occasional sightings in winter and spring. The birds rarely stay any length of time and are usually seen flying over.	
Osprey (<i>Pandion haliaetus</i>)	Very rare
Three records of single birds, one SW over the Tarn 15/8/85 (RB, EJ <i>et al.</i>), and near the Tarn on 20/5/88 (PC) and 22/9/88 (BS).	
Kestrel (<i>Falco tinnunculus</i>)	Common B Sp Su Au (W)
'Up to four prs breed when voles are plentiful, odd birds are resident but most leave in autumn' (Holmes, 1960) is still valid. There is a variable movement of birds through the area in spring, with a more obvious movement in autumn.	
Merlin (<i>Falco columbarius</i>)	Scarce FB Sp Au
One pr possibly breeds in the area or just outside it in some years, otherwise small numbers of mainly f. and imm. birds pass through Mar-Apr and Sept-Nov.	
Hobby (<i>Falco subbuteo</i>)	Very rare
Single birds near the Tarn 15/8/70 (IM) and 2/6/83 (EJ).	
Peregrine (<i>Falco peregrinus</i>)	Common Y esp Au
Single birds noted in most months, with breeding now taking place annually just outside the area. In recent years imm. birds have taken up residence in suitable breeding habitat for a few weeks.	
Red Grouse (<i>Lagopus lagopus</i>)	Common Y
Small numbers are resident on Tarn Moss, 5 m. in territory here in 1966, 7 in 1967, only 2 in 1989. Probably no more than 10 birds on the Moss in recent years. An influx has taken place in late autumn/early winter in at least two years when up to 20 birds present. These birds are probably overspill from the Fountains and Darnbrook Fell populations in good breeding years.	
Black Grouse (<i>Tetrao tetrix</i>)	Formerly uncommon now rare
Holmes (1960) states that a lek just outside the area held up to 16 m., a more recent figure is 12 m. and 3 f. The only recent records are 2 m. on Tarn Moss in Feb, with one there 27/4/83, a	

pr on Fountains Fell 9/4/84 and a m. near Malham Tarn 19/8/84 and 1 f. on 28/1/90 near Henside.

Red-legged Partridge (*Alectoris rufa*) Very rare
Single birds near Capon Hall 22/4/86, near Tennant Gill 24/6/87, 2 Sannat Hall on 4/8/87 and one Darnbrook early Mar 1989.

Grey Partridge (*Perdix perdix*) Uncommon B Y
Resident in small numbers, with coveys seen in most autumns. Eleven Capon Hall on 7/10/89.

Pheasant (*Phasianus colchicus*) Common B Y
Resident in Tarn Woods (maximum 18 on 26/12/89), it also occurs in small numbers in the new plantations at Darnbrook.

Water Rail (*Rallus aquaticus*) Very rare W (Sp)
One seen on the Fen 26/5/49 (PH) but there are no other records of summering birds. There are odd sightings of birds in winter.

Spotted Crake (*Porzana porzana*) Very rare
One Tarn Fen 13–20/6/48 calling from dusk till dawn (PH).

Corncrake (*Crex crex*) FB? no recent records
The last records of birds heard on Malham Moor and near Malham were in late May 1952 and early Jun 1954.

Moorhen (*Gallinula chloropus*) B Y
Two or three prs resident around the Tarn 1966–67. After 1967 there were no further breeding records until in 1988 when there was an unsuccessful attempt. In this interval a decline took place but it is not possible to say exactly when this occurred. Four sightings of single birds in 1989, 17/3/89, 9 & 31/10/89 and 5/11/89 but breeding was not proven. In 1990 a pr reared 2 young and three birds were noted till the end of the year. A combination of hard winters and the arrival of mink in the area probably being responsible for the decline. Maximum recorded in winter was 14 on 27/12/74.

Coot (*Fulica atra*) Common B Y esp W
There has been an increase in both the breeding and wintering population. In the 1950s 4–7 prs bred, 8 prs 1966, 15 in 1978, 10 in 1980, and 19 in 1987. Autumn–Winter counts in last decade are now well in excess of 150–240 (Holmes, 1960), maximum counts in recent years are 720 Oct 1974, 950 on 3/1/76, 555 on 22/12/79, 570 on 7/12/81, 500+ on 4/10/85, 550 on 17/11/86 and 640 on 17/10/89. This is one of the most important wintering sites in Yorkshire which considering its altitude is surprising. When the Tarn freezes over, most birds disperse to as yet unknown destinations but return fairly quickly when a thaw occurs.

Oystercatcher (*Haematopus ostralegus*) Common B Sp Su Au
One or two prs attempt to breed annually since colonisation in 1978, breeding was proven in 1989 near the Tarn. Main arrival Mar and departure Aug, with a few passage birds also during spring and autumn. Earliest date 24/2/90 and latest date 7/9/90.

Stone Curlew (*Burhinus oedicnemus*) Very rare
One Malham Ings at the end of Apr 1895 (Nelson, 1907).

Little Ringed Plover (*Charadrius dubius*) Very rare
One on Great Close Mire 12/6/50 and 2/6/51.

Ringed Plover (*Charadrius hiaticula*) Scarce FB
First recorded from the Tarn 10 and 23/5/09 : in 1937 a pr bred on Great Close Mire (Bedford, 1937) and probably in several succeeding years. Since 1948 there have been three late May records in unspecified years (Holmes, 1960), and 10/6/54, 18/8/50, 1 on 14/9/75, 3/4/76 and 1 on 7/8/83 with 3 on 28/8/83, 1 on 15/5/88, 4 on 11/5, 1 on 19/5 and 1 on 20/8/89 and 2 on 6/5/90. There has been no breeding attempt for at least 40 years.

Dotterel (<i>Charadrius morinellus</i>)	Very rare
One Fountains Fell on 14/9/52 (Chislett, 1953), 2 on 28/5/55 (Holmes, 1960), 2 on 6/5/73 (FR) and 5 near the Tarn 7/5/86 (PW).	
Golden Plover (<i>Pluvialis apricaria</i>)	Common B Sp Su Au
Six to 10 prs breed on Fountains Fell with one pr in most years on Great Close Mire, arriving Feb–Mar and departing Aug–Sept. Up to 16 prs were found on Fountains and Darnbrook Fells in the early 1970s (Bell, 1979). During Mar–Apr flocks of mainly northern race birds (<i>C. a. albifrons</i>) pass through the area, one flock gathers near Middle House, up to 150 birds in some years. Autumn passage Aug–Nov also probably contains many northern race birds.	
Grey Plover (<i>Pluvialis squatarola</i>)	Very rare
Single birds at the Tarn 18/9/72 (BS) and 3/5/86 (CP).	
Lapwing (<i>Vanellus vanellus</i>)	Common B Sp Su Au (W)
Common breeding bird, arriving Feb–Mar and departing Oct–Nov. The only instance of birds wintering was in the very mild winter of 1974/75 when 20 birds stayed near the Tarn, numbers increased to 120 on 12/1/75 and 80 on 1/2/75. A bird with white wings seen near Settle sewage farm in Feb was seen on Malham Moor in Aug and back at the sewage farm, Settle on 25/10/74. A pr bred on the summit plateau of Fountains Fell in 1978 and probably does so in other years, the bulk of breeding population being on the lower ground of Malham Tarn Estate. BTO census 7 prs in 1966, 8 prs in 1967. Flocks which form on the moor from Jun to Aug are probably local breeding birds.	
Knot (<i>Calidris canutus</i>)	Very rare
One by the Tarn 14/11/49 (Holmes, 1960).	
Purple Sandpiper (<i>Calidris maritima</i>)	Very rare
One at Malham Nov–Dec 1906 (Chislett, 1952).	
Dunlin (<i>Calidris alpina</i>)	Common B Sp Su Au
Three or 4 prs breed Fountains Fell with 1 or 2 near the Tarn, arriving Apr and departing Aug. Five–seven territories Fountains Fell in the early 1970s (Bell, 1979). Regular passage migrant in small numbers around edge of Tarn during Apr–Jun and Aug–Nov.	
Ruff (<i>Philomachus pugnax</i>)	Very rare
One Malham Moor 6/9/78 (SR).	
Jack Snipe (<i>Lymnocryptes minimus</i>)	Rare Au W
There are only ten records of single birds, an injured bird near Rough Close Farm on 19/12/78, near Low Trenhouse 12/1/81 and on Tarn Moss on 13/11/88. Recent records of single birds around the Tarn on 9/10/89, 11, 19 and 29/11/89, 10/2/90, 7/10/90 and 30/11/90. This species is likely to be under recorded.	
Snipe (<i>Gallinago gallinago</i>)	Common B Sp Su Au (W)
A fairly common breeding bird from late Mar to Oct–Nov. 19 prs around the Tarn in the BTO Census of 1966 with 23 prs the following year. A few birds are recorded most winters. Maximum 13 near the Tarn on 17/10/89.	
Great Snipe (<i>Gallinago media</i>)	Very rare
Two shot on high ground, Malham 6 Sept 1862. (Peake, 1896).	
Woodcock (<i>Scolopax rusticola</i>)	B Sp Su Au (W)
'One pr usually breeds in Tarn Woods' (Holmes, 1960). In the BTO Census the Malham Tarn Estate held 4 prs in 1966, and 3 in 1967. The population is now at least 4 prs and with the new plantations at Darnbrook probably holding a few more. Single birds are recorded in most winters mainly on Tarn Fen.	
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Very rare
Five in non-breeding plumage by the Tarn 29/6/47 (Chislett, 1952), 1 on 22/8/73 at Tarn Outflow, with 2 there on 16/7/82 (EJ) and 1 on 11/9/87 over the Tarn (BS). One on 2/9/90 (BS).	

Whimbrel (<i>Numenius phaeopus</i>)	Scarce Sp Au
Small numbers pass through both in spring and autumn, main months are Apr–May and Jul–Aug. Usually single birds, maximum 8 S over Fountains Fell 2/8/70.	
Curlew (<i>Numenius arquata</i>)	Common B Sp Su Au
A common breeding bird arriving Feb–Mar, departing Sept–Oct e.g. 1987 recorded 28 Feb–18 Oct. 15 prs on Malham Tarn Estate 1966 in the BTO Census with 18 the following year. A flock of up to 500 birds still gathers on Tarn Moss from Apr to early Jun presumably non-breeding or passage birds. The formerly large moulting flock, up to 3,000 birds which assembled near the Tarn Aug–Sept (Holmes, 1960) has rarely reached more than 500 birds in recent years. Flock totals in recent years: 900 on 10/9/74, 60 on 8/6/76, 100 on 27/3/71, 200 on 12/3/75 and 500 on 29/3/88. Recorded irregularly during winter months usually single birds passing through area. 1 on Fountains Fell 1/1/82.	
Redshank (<i>Tringa totanus</i>)	Common B Sp Su Au (W)
Arriving Mar leaving Aug with a few passage birds Apr and Sept. 5 prs on Malham Tarn Estate 1966 with 6 the following year. C. 25 prs Malham Moor in 1985. The only winter record is of a single bird near the Tarn 20/12/70.	
Greenshank (<i>Tringa nebularia</i>)	Scarce (Sp) Au
A regular late summer autumn passage bird from 4 Jul (1978) to 2 Oct (1985) in very small numbers, usually single birds around edge of Tarn. There is only one spring record of a single bird near the Tarn on 13/5/82.	
Green Sandpiper (<i>Tringa ochropus</i>)	Very rare Au
Three records 12–18/8/50 and 25/9/50. and 12/8/52 (Holmes, 1960).	
Wood Sandpiper (<i>Tringa glareola</i>)	Very rare
A single bird near the Tarn 21/8/83 (BS) is the only record.	
Common Sandpiper (<i>Actitis hypoleucos</i>)	Common B Sp Su Au
Arriving late Apr, and leaving Jul–Aug with a few passage birds in spring and autumn. 7 prs on Malham Tarn Estate in 1966 with 8 the following year. Five or six prs around the Tarn in 1989. 1 or 2 prs also on the beck at Darnbrook Farm.	
Turnstone (<i>Arenaria interpres</i>)	Very rare
Three on 15/5/58 (Holmes, 1960) and 5 W on 14/5/90 (AC) both near the Tarn.	
Red-necked Phalarope (<i>Phalaropus lobatus</i>)	Very rare
One at the Tarn 3/6/65 (PM).	
Arctic Skua (<i>Stercorarius parasiticus</i>)	Very rare
One light phase bird probably an imm. at the Tarn on 4/9/40 (Chislett, 1952).	
Great Skua (<i>Stercorarius skua</i>)	Very rare
One on the Tarn on 20/9/85 (GR) and one there on 12/9/88 (BS).	
Black-headed Gull (<i>Larus ridibundus</i>)	Common Y esp Au FB
Recorded in all months. Formerly bred on Fountains Fell e.g. 56 prs in 1950. No longer nests by the Tarn, on Tarn Moss or Great Close Mire, last breeding record 1967, although birds were seen in suitable habitat near the Tarn in May 1982. Increased roosting since 1960s peaking in spring with 1,500 in Mar 1975 and in autumn 9,400 on 16/8/74 and 3000 on 13/11/89. Ringing recoveries — one ringed on 29/6/73 at Sunbiggin Tarn as young recovered dead on 26/8/76, one ringed as pullus Locker Tarn, Carperby, 10/6/66 found dead at Malham Tarn 8/10/78. Two foreign ringed birds have been found at the Tarn one on 19/8/89 was ringed in Lithuania (details not yet received), the other found on 24/7/90 was ringed as a nestling at Fruensholm, Denmark on 21/6/89.	
Common Gull (<i>Larus canus</i>)	Common (B) Sp (Su) Au W
In 1955 a pr bred at the Tarn, this was the first breeding record for Yorkshire since then a pr bred irregularly in the area until 1984. The pr bred successfully in 1969, 1970, and 1971.	

Increase in roosting birds in spring from several 100 (Holmes, 1960) to 3,000 on 18/3/78 and autumn 1,000 on 5/11/50 (Mather, 1986), 300–600 (Holmes, 1960) to 2,600 on 10/9/74 with an estimated 2,000 there on 13/11/89. Odd records of birds between mid Apr–mid Jul. 2 on 17/6/81, and singles on 25/5/83 and 7/5/85.

Lesser Black-backed Gull (*Larus fuscus*) Common FB Sp (Su) Au (W)
 A few bred Tarn Moss in 1920 and 6–7 prs in 1921 but gamekeepers prevented the colony continuing (Holmes, 1960). Passage migrant late Mar–end Apr and Aug–Sept with lesser numbers outside these periods. Spring peak 50 on 29/4/82. Autumn peak 750 in Aug 1974. Winter records 2 Malham Tarn on 7/1/81 and 7/12/81, 2 on 13/12/87. One *L. f. fuscus* on 28/9/55.

Herring Gull (*Larus argentatus*) Common Y FB?
 Regular visitor to the Tarn throughout the year in small numbers, in the last two years there has been a marked movement in Jan–Feb. Notable counts 25 on 26/1/89, 60+ on 2/2/89 and 25 on 22/1/90.

Great Black-backed Gull (*Larus marinus*) Common Sp (Su) Au W
 Small numbers at the Tarn in all months. Notable flocks were 17 in Jan 1968, 8 in Nov 1985, 25 on 9/2/89 and 45 on 6/1/91.

Kittiwake (*Rissa tridactyla*) Very rare
 Three records one of an imm. flying W near Tennant Gill on 30/10/86 (BS), 90 including 1 juv. flew from the E and landed on the Tarn on 17/11/87 (AC) and 2 adults on 10/3/90 (BS).

Sandwich Tern (*Sterna sandvicensis*) Very rare
 Two W over the Fen on 6/5/90 (BS).

Common Tern (*Sterna hirundo*)

Arctic Tern (*Sterna paradisaea*) Rare Sp (Su) (Au)
 Passage migrant in May (8 records) and single records Jun, Aug and Sept. Of the records specifically identified 7 records were of Common Terns. Maximum 20 possibly Common Terns 31/5/81.

Little Tern (*Sterna albifrons*) Very rare
 One by the Tarn on 17/9/50 after severe storm (PH).

Black Tern (*Chlidonias niger*) Rare Sp Su (Au)
 Passage migrant singles mostly in May and Jun in recent years but recorded by Holmes in Aug, Sept and Oct. Maxima 21 on 9/5/54 (Holmes, 1960) with 10 on 16/6/86 (HM). Probably under recorded and it is likely to be an annual passage bird at the Tarn following easterly winds.

Razorbill (*Alca torda*) Very rare
 One picked up in March 1894 ‘on the high moorland near Malham Tarn’ (Nelson, 1907).

Stock Dove (*Columba oenas*) Common B Sp Su Au
 Breeds on cliffs and in barns. Not resident returning in late Jan–Feb, departing Sept–Oct.

Woodpigeon (*Columba palumbus*) Common B Sp Su Au (W)
 Summer visitor returning 8 Feb (1989)–22 Mar (1982). BTO Census recorded 17 prs breeding on the reserve in 1966. A notable flock of 40 birds was seen on 5/11/89. Ten plus wintered in 1976–1977 after an exceptional beech mast year.

Collared Dove (*Streptopelia decaocto*) Rare Y
 All records near the Tarn: first 1 on 25/5/67, 1 on 3/4/76, 3 on 11/1/85 and singles at Waterhouses on 14/5/87 and 3/7/87, 1/4/90 and 26/5/90.

Cuckoo (*Cuculus canorus*) B Sp Su
 BTO Census 1966 and 1967 counted 3 territorial m. on the Reserve. Probably decreased, in recent years only the occasional transient singing bird noted. Earliest and latest dates 29/4/77 and 1/9/87.

Barn Owl (<i>Tyto alba</i>)	Very rare
There have been no records added to those given in Holmes (1960) and it must be considered extinct in the area. One flushed from a cliff behind Tarn House 6/9/48 and one at a barn 8/2/59.	
Little Owl (<i>Athene noctua</i>)	Common B Y
Breeding at a good many sites in the area in barns, cliffs and probably rabbit holes. It suffers badly in hard winters but quickly recolonises, presumably from lower ground where it is a common species.	
Tawny Owl (<i>Strix aluco</i>)	Common B Y
Breeds in Tarn Woods and environs in small numbers. BTO Census 1966 2 prs and 1967 3 prs. Population fluctuates dependent on the size of the vole population. A bird found in Tarn Woods on 7/11/88 had been ringed there on 25/5/67 as a first year bird. This is currently the longest lived tawny owl known from ringing in Britain.	
Long-eared Owl (<i>Asio otus</i>)	Very rare FB
One pr bred successfully in Tarn Woods in 1982 during a vole plague on Tarn Moss. One flushed from Tarn Fen on 22/11/89 (AC).	
Short-eared Owl (<i>Asio flammeus</i>)	Scarce (B)(Sp) Su Au
Passage migrant. Singles seen in autumn of most years (Jul, Aug and Sept). One record in spring on Fountains Fell on 30/4/74. Holmes (1960) recorded it as breeding on Fountains Fell in 1949 and 1958. It has since been recorded breeding at Darnbrook Plantations.	
Swift (<i>Apus apus</i>)	Common FB Sp Su Au
Birds seen feeding over the Tarn from May–Aug. In 1979 and probably in 1990 a pr bred at Rough Close Farm at 485 metres above sea level. Maximum 500 near Malham Tarn in cold weather on 20/7/79. Earliest date 6/5/90 and latest date 21/8/90.	
Kingfisher (<i>Alcedo atthis</i>)	Uncommon Su Au W
Records of single birds in most years Jan–Feb and Jun–Dec. Most commonly recorded in autumn but no records in 1978 or 1987.	
Green Woodpecker (<i>Picus viridis</i>)	Rare
Ten records of single birds from Tarn Woods between Apr–Aug. (4 in May and single records in Apr, Jun, Jul and Aug). Recent records 9 Sept–year end 1987, 3 Apr–3 May 1988 and 28/7/89.	
Great Spotted Woodpecker (<i>Dendrocopos major</i>)	Rare
Ten records of single birds in Tarn Woods, 19/10/48, 11/7/57, 10/2/77, 2/5/80, drumming 10/5/82, 1/10/84, Round Wood 31/8/88, Tarn Woods 16/7–12/8/89 and Waterhouses 10/9/90 and 17/9/90.	
Lesser Spotted Woodpecker (<i>Dendrocopos minor</i>)	Very rare
Three records, all singles, Tarn Woods 10/8/50 (Holmes, 1960), 9/2/51, Tarn Fen and Moss m. 1/9–10/11/90. (4 sightings) (BS).	
Skylark (<i>Alauda arvensis</i>)	Common B Sp Su Au (W)
Mainly a summer visitor with a total of 58 prs recorded during 1967 BTO Census comprising 42 prs Malham Lings, 10 prs Great Close Mire, 4 prs Tarn Moss and 2 prs Great Close Scar. Earliest record 22/1/88. Latest record 12/12/71. Usual arrival is in Feb. Largest count 300 Low Trenhouse on 9–14/4/78.	
Sand Martin (<i>Riparia riparia</i>)	Uncommon FB now Sp (Su) Au
Breeding at the Tarn at least since 1896 (Peake, 1896). Nineteen nests holes with 30–40 birds present at Tarn Moss on 12/8/66, 1,015 prs in 1977, present but no breeding (due to cold wet season?) in 1978, only 1 bird present 1979, last breeding record 1980 when 1 pr bred. Now only a passage migrant in small numbers with earliest record 14/4/81, and latest 20/9/83.	

Swallow (<i>Hirundo rustica</i>)	Common B Sp Su Au
Breeds Waterhouses and other farms in the area. Five prs Tarn House in 1966. Earliest record 11/4/80. Latest record 9/10/80.	
House Martin (<i>Delichon urbica</i>)	Common B Sp Su Au
Usually breeds Waterhouses and other farms e.g. Rough Close, Darnbrook and Rainscar. Arrives late Apr–May. Earliest 28/4/87. Latest record 25/11/60.	
Tree Pipit (<i>Anthus trivialis</i>)	Common B Sp Su Au
It now breeds in much smaller numbers than in 1960s with none now breeding in Tarn Woods. BTO Census 1967 — Tarn Woods 4 prs, and 1 pr in the Fen and Horseshoe Plantation. In recent years only one pr in territory on the Fen. Earliest record 10/5/80. Latest record 16/8/88.	
Meadow Pipit (<i>Anthus pratensis</i>)	Common B Sp Su Au (W)
Common breeding bird, usually a summer visitor but with a few winter records. BTO Census in 1967 gave 78 prs on territory. Main arrival is late Mar–May, maximum 100 on 2/5/48. Autumn passage Sept–Oct. Winter records singles except where stated 4/1/59, Tarn Moss 24/1/81, 6 on 2/2/76, 21/11/67, Tarn Fen on 3/12/83, Tennant Gill on 14/12/74, 7 on 22/11/87, 2–3 birds wintered 1988–89 and 1989–90 on Tarn Moss.	
Yellow Wagtail (<i>Motacilla flava</i>)	Common B Sp Su Au
Probably breeding in lesser numbers than in the 1960s. BTO Census 1967 — 17 prs, c. 25 prs Malham Moor 20/6/85. Earliest record Malham Tarn 16/4/87. Latest 16 September 1990. Peak count 100 Malham Tarn on 3/5/79. A bird of the nominate race <i>M. f. flava</i> (Blue-headed Wagtail) was seen on Tarn Moss on 4/5/78. (EJ)	
Grey Wagtail (<i>Motacilla cinerea</i>)	Common B Sp Su Au
The present status remains as in Holmes (1960) with one–two prs breeding Darnbrook and upper Cowside Becks. Otherwise a regular passage of single birds at the Tarn Mar–Apr and Aug early Oct with a winter record on 25/11/89. Unusually 5 were seen on 26/8/90. Earliest date 25/2/90 and latest date 7/10/90.	
Pied Wagtail (<i>Motacilla alba</i>)	Common B Sp Su Au
The BTO Census around Malham Tarn noted 3 prs 1967. Recorded Mar–Sept earliest 8 March (Holmes, 1960) latest 9/10/89. An exceptional record of 1 on Malham Moor 14/11/75. Small numbers of the nominate race <i>M. a. alba</i> (White Wagtail) occur on spring passage.	
Waxwing (<i>Bombycilla garrulus</i>)	Very rare
Three by Tarn House 13/12/58 and 10 near Tarn House on 5/11/65.	
Dipper (<i>Cinclus cinclus</i>)	Common B Y
Holmes recorded 7 prs in the area. Infrequently recorded from the Tarn 1 on 23/11/79 and 1 on 3/12/80.	
Wren (<i>Troglodytes troglodytes</i>)	Common B Sp Su Au (W)
Usually a summer visitor but a few resident in mild winters e.g. 1987, 1988 and 1989. 15 territories Tarn Woods in 1966 and 1978, 24 in 1967. 12 on walls Middle House 1/11/59 presumably passage migrants (Holmes, 1960).	
Dunnock (<i>Prunella modularis</i>)	Common B Sp Su Au (W)
Resident in small numbers. BTO Census 23 territories in 1966 and 1967, marked decrease with no more than 4 prs in 1989.	
Robin (<i>Erithacus rubecula</i>)	Common B Y
Small numbers resident with a noticeable passage in spring and autumn. Thirteen territories Tarn Woods in 1966 (12 in 1967). Total of 20 territories around Malham Tarn in 1966. One ringed Malham Tarn Fen 18/7/86 controlled Retford, Notts. 30/8/86.	
Redstart (<i>Phoenicurus phoenicurus</i>)	Common B Sp Su Au
Summer visitor with 16 territories in 1966 and 15 in 1967. Marked decrease with only 6 prs in 1977 (4 in nestboxes). Earliest record 4 Apr (1980), the latest a.f. on 15 Sept (1988).	

Whinchat (<i>Saxicola rubetra</i>)	Uncommon B (Sp) Au
Breeds Darnbrook Plantations with passage in small numbers in spring (May) and autumn (Aug–Sept). 1 pr in territory Ha Mire in 1966, and a m. on the Fen in Jun 1977. Earliest spring record a m. on 1/5/79, latest record 1 High Trenhouse 15/10/83.	
Stonechat (<i>Saxicola torquata</i>)	Rare
Only three recent records, all single birds, a m. near Rough Close on 13/3/88, Capon Hall on 11/10/89 and prior to this the previous record was in 1975. 2 prs above Gordale 14/8/49. Other records all singles except where stated, a m. near the Tarn 27/10/49, a m. in the Tarn area on 15/5/42, 1 m. on 17/3/72, 1 on 5/3/75. 1m. Tennant Gill and 1m. Sannat Hall on 3/3/75, 3 Malham Moor on 14/10/75, and Capon Hall on 23/10/75.	
Wheatear (<i>Oenanthe oenanthe</i>)	Common B Sp Su Au
Common summer visitor with 5 territories around Malham Tarn in 1966, 7 in 1967. Earliest record 10/3/77, latest 24/10/82. There are a few records of the race (<i>O. O. leucorrhoea</i>) 4 summit Fountains Fell on 14/9/59, and 2 m. there on 8/5/74.	
Ring Ouzel (<i>Turdus torquatus</i>)	Common B Sp Su Au
It was recorded as breeding on Great Close Hill (2 prs BTO Census 1966) but no longer does so. This could be due to increased visitor pressure. However it still breeds on Fountains Fell. Arrives late Mar–early Apr. Earliest date 16/3/73, departing Sept–Oct. Latest date 30/10/88. Five noted Tarn Fen on 29/9/89.	
Blackbird (<i>Turdus merula</i>)	Common B Sp Su Au (W)
Summer visitor arriving in late Mar, with noticeable passage in spring and autumn. Maximum noted 60+ m. near Malham Tarn on 29/4/84 probably migrants. One wintered Rainscar Farm at 437 metres in 1978 spending its time mostly in a barn, only venturing out in mild weather. BTO Census in 1966 gave 38 territories (46 in 1967) with the majority in Tarn Woods — 22 in 1966 and 25 in 1967. One nest on a limestone outcrop Fountains Fell 240 metres above sea level in 1976. One bird was controlled at Malham in Jul 1982 which had been ringed in 1979 on the Isle of Man as a juv. and again controlled Malham Tarn 1984.	
Fieldfare (<i>Turdus Pilaris</i>)	Common Sp (Su) Au (W)
Passage migrant in Oct–Nov and Mar–Apr, exceptional record of one bird 5/6/58 (Holmes, 1960). Autumn maximum 1,500 near Sannat Hall and 1,000 Tennant Gill on 5/11/73. Earliest date 27/9/90 and latest date 2 on 24/5/73. Winter records 280 on 28/12/77. Middlehouse on 22/1/87, 20 Pinewood on 31/12/87.	
Song Thrush (<i>Turdus philomelos</i>)	Common B Sp Su Au (W)
Breeding summer visitor BTO Census 1966 and in parenthesis 1967 gave the following figures: Tarn Woods 26 (27), Fen 6 (8), Horseshoe Plantation 6 (7), Spiggot Hill Plantation 1 (0). In 1978 there were 19 territories in Tarn Woods. Possible decline since then. Usual arrival mid–late Feb with departure in Oct. Some passage noted Mar–Apr and Sept–Oct. Earliest date 9/2/89 with the latest 29/11/80.	
Redwing (<i>Turdus iliacus</i>)	Common (Sp) Au
Passage migrant Sept–early Nov and less regularly in spring. Rare mid winter. Earliest record 20 Tarn Woods on 26/9/84. Maximum 500+ Tarn Woods on 8/10/82. Latest record 13/5/77.	
Mistle Thrush (<i>Turdus viscivorus</i>)	Common B Sp Su Au (W)
Breeding summer visitor which occasionally winters. BTO Census 1966 gave 1 pr on the Fen and one pr in Tarn Woods but in 1967 only one pr on the Fen. In 1987–90 one pr probably bred near Waterhouses, with an additional pr in Tarn Woods in 1989 and 1990. Maximum recorded 40+ on 13/8/89. Wintering maximum 5 on 26/12/87.	
Grasshopper Warbler (<i>Locustella naevia</i>)	Very rare (FB)
Bred on Tarn Fen 1948. 1 heard 3/5/53, 1 on 2/5/70, probably passage migrants, 1 Tarn Fen 13/7/82 and 1 singing there 27/7/90.	

Sedge Warbler (<i>Acrocephalus schoenobaenus</i>)	Scarce (FB) Sp (Su)
Birds recorded on the Fen in most years, usually in spring, with the only breeding record 1951 (Holmes, 1960). Earliest date 29/4/77, 4 juv. caught and ringed on Tarn Fen in Jul 1985. Latest date 1 Tarn Fen on 14/9/90.	
Lesser Whitethroat (<i>Sylvia curruca</i>)	Very rare
Two records of single singing birds in Tarn Woods on 30/5/66 and 12/5/82. Two autumn records of single birds at Ha Mire Plantation on 2/8/89 and Tarn Fen 27/8/90.	
Whitethroat (<i>Sylvia communis</i>)	Formerly uncommon (FB) now rare
Declined in recent years, affected by the drought in its wintering area. It bred in 1957, possibly in 1959, and 2 prs were recorded in 1966 and 1967. The only other recent records are singing birds 1977, 1 on 13/6/80 and 1 on Tarn Fen 1/5/82.	
Garden Warbler (<i>Sylvia borin</i>)	Scarce B Sp Su Au
Breeds in small numbers (3–4 prs) almost annually. Earliest arrival 9/5/89 with latest 5/8/89.	
Blackcap (<i>Sylvia atricapilla</i>)	Common B Sp Su Au
Breeds annually. BTO Census 4 prs Tarn Woods, 1 pr Horseshoe Plantation in 1966 with similar population today. Arriving May mid Jun. Earliest date 6/5/90 and latest date 16/9/89.	
Wood Warbler (<i>Phylloscopus sibilatrix</i>)	Uncommon B Sp (Au)
A pr probably bred 1975. Singing birds recorded in spring almost annually but first confirmed breeding attempt Tarn Woods 1989. Earliest date 27/4/82. Latest record — one killed by cat at Middlehouse on 13/8/82.	
Chiffchaff (<i>Phylloscopus collybita</i>)	Uncommon (B?) Sp (Su) Au
Regular passage migrant in small numbers spring and autumn, although a juv. caught and ringed in Jul 1985 suggested breeding. Earliest record 1/4/89 with the latest 8/10/82. Two winter records of single birds in Tarn Woods on 5/11/89 and 4/11/90.	
Willow Warbler (<i>Phylloscopus trochilus</i>)	Common B Sp Su Au
Passage migrant. Summer visitor, breeds in considerable numbers. Tarn Woods held 48 territories in 1978 c. f. 39 territories in 1966. Earliest arrival 9/4/89. Latest date 16/9/90.	
Goldcrest (<i>Regulus regulus</i>)	Common B Y
Resident population which suffers in severe winters. BTO Census 3 prs Tarn Woods 1966 and 1967, 1 pr Horseshoe Plantation and Pothole Lane. No breeding 1979. Passage birds noted Apr and Sept–Oct. Fifty plus Tarn Woods and Fen 16/9/89. Twenty plus Tarn Fen on 10/9/90.	
Firecrest (<i>Regulus ignicapillus</i>)	Very rare
One with goldcrests Tarn Fen on 4/4/88 (TW, BS, AC).	
Spotted Flycatcher (<i>Muscicapa striata</i>)	Common B Sp Su Au
Breeds in small numbers 2–5 prs Holmes (1948–60), 11 prs Tarn Woods 1966, 5 prs Tarn Woods 1978, 10 used nest boxes 1979, recorded as next most abundant summer visitor after willow warbler in 1980. Earliest record 1/5/84, latest record 12/10/81.	
Pied Flycatcher (<i>Ficedula hypoleuca</i>)	Uncommon (B) Sp Su (Au)
Summer visitor which breeds irregularly — probably bred in 1948. bred in 1966, 1978 and 1987. Five singing birds Tarn Woods in 1989. Passage migrant most frequent in spring (earliest record 6/5/90) with the latest record a single bird at Globe Flower Wood on 13/8/81.	
Long-tailed Tit (<i>Aegithalos caudatus</i>)	Rare (FB) Sp Su Au
Rare visitor arriving Oct–Nov, sometimes wintering. A flock of thirteen birds first seen in late Oct 1984, overwintered, subsequently two prs bred the following year. Other records 30 Tarn Woods 2–8/2/57, 4 on 3/11/75, 7 Tarn Woods 9/10–16/11 1987, 9 Waterhouses on 29/10/89, and up to 12 birds present Tarn Woods Oct–Nov 1990.	
Marsh Tit (<i>Parus palustris</i>)	FB no recent records
Formerly a resident breeding bird. Holmes records at least 2 prs (1960) and the BTO Census 1966 and 1967 records 3 prs in Tarn Woods. Last bred 1970. A single bird was recorded in 1975 and this is the last known record.	

Willow Tit (<i>Parus montanus</i>)	Very rare
Three records of single birds all from Tarn Fen 12/11/74, 10/10/83 until the end of 1985 and one 2–3/8/89.	
Coal Tit (<i>Parus ater</i>)	Common B Sp Su Au (W)
One to 4 prs Tarn Woods, some wintering (Holmes, 1960). BTO Census 1 pr Tarn Woods 1966 and 1967. Two prs recorded Tarn Woods 1990.	
Blue Tit (<i>Parus caeruleus</i>)	Common B Y
Resident breeding bird 2–10 prs (Holmes, 1960). 14–15 prs (BTO Census 1966–67) with 24 prs maximum on the whole estate 1966. Passage in autumn suggested by small parties north over open ground on 3/10/57, and 60 Tarn Woods on 4/11/59. One ringed as a juv. on 4/9/82 Tarn Fen, was found dead Giggleswick, 9 km SW 28/10/82.	
Great Tit (<i>Parus major</i>)	Common B Y
Breeding resident 1–4 prs (Holmes, 1960). BTO Census 7 prs 1966 and 3 prs 1967. No recent breeding census.	
Nuthatch (<i>Sitta europaea</i>)	Common B Y
First record 1 Tarn Woods on 4/5/57. First bred 1971. Two prs until 1977 when a severe winter reduced the population to a single bird. Tarn Woods 1 pr bred 1984, 1985, 1987, 1988, 1989 with 2 prs 1990.	
Tree creeper (<i>Certhia familiaris</i>)	Common B Y
Breeding resident 1–3 prs Holmes 1960, 3 prs noted BTO Census 1966 and 1967, present status similar. Suffers like other residents from severe winters.	
Jay (<i>Garrulus glandarius</i>)	Very rare
One West Fen in late May (no date) 1967 (Williamson, 1968). 15 at the Tarn on 13/10/83 during a huge influx into Britain. One trapped and ringed by T. Williams, left in SW direction. One Fen 21/10/88 (BS).	
Magpie (<i>Pica pica</i>)	Common B Y
One or two prs have bred in recent years (first 1983 since 1948–50). Prior to this they were unwelcome spring visitors which were exterminated (Holmes, 1960). Up to 5 noted Waterhouses 1990.	
Jackdaw (<i>Corvus monedula</i>)	Common Sp Su Au (W)
Common non breeding visitor to the area seen throughout the year.	
Rook (<i>Corvus frugilegus</i>)	Common B Y
Breeding summer visitor, with some birds wintering. Rookeries at Low Trenhouse founded 1959 — 10 nests, 1981 — 16 nests, 1987 — 35 nests. Stangill Barn 10 prs 1976, 6 nests in 1981, 17 prs in 1982. The plantation was felled in 1984 after it was ring barked by sheep. Spiggot Hill Plantation first breeding 1983 — 14 nests, 1987 — 97 nests, 1990 — 170 nests.	
Carriorn Crow (<i>Corvus corone</i>)	Common B Y
Resident breeder. BTO Census 1966 — 5 prs around the Tarn, 1967 — 2 prs. Still common despite persecution. Birds showing characteristics of the race <i>C. c. cornix</i> Hooded Crow 2 Capon Hall 8–30/1/51, and 1 near High Trenhouse 13/3/74.	
Raven (<i>Corvus corax</i>)	Uncommon (FB) Y
Non breeding visitor seen throughout the year. Fountains Fell singles 25 & 30/4/74 & May 1974. 2/10/80, 2 on 13/11/85. Near Malham Tarn 6 on 8/12/62, 1 on 4/3/75, 2 on 13/6/75, 1 on 30/11/75, 1 on 13/3/77, 2 on 15/10/82, 2 on 2/12/83, 1 on 14/8/84, 1 near the Tarn 13 & 23/10/88, up to 7 near the Tarn from 19 Oct to the end of 1989, with up to three seen throughout the year during 1990. Ringing recovery — a nestling ringed in NW England 14/5/39 was recovered Malham Moor in the winter of 1940/41 (Mather, 1986).	

Starling (<i>Sturnus vulgaris</i>)	Common B Y
Breeding resident with large influxes in the spring and autumn. BTO Census 1966 12 prs Tarn Woods, 22 prs around the Tarn. Peak counts 5,000 on 9/7/48 and 6,000 Sannat Hall 22/3/75.	
Rose-coloured Starling (<i>Sturnus roseus</i>)	Very rare
An adult near Malham Tarn on 30/6-1/7/79 (MT & BS).	
House Sparrow (<i>Passer domesticus</i>)	Common B Y
Breeding resident. Common resident on all farms (Holmes, 1960). BTO Census 10 prs Tarn House and Close 1966. Current status (1990) — absent from Tarn House, Waterhouses, Middlehouse, Tennant Gill, Rough Close, Rainscar, but present Darnbrook, Low Trenhouse, High Trenhouse, Capon Hall and Westside House.	
Chaffinch (<i>Fringilla coelebs</i>)	Common B Y
Breeding summer visitor, some wintering. BTO Census 32 prs Tarn Woods (1966) with a total of 51 prs around the Tarn. Arrival of m. late Jan-Mar with f. slightly later but usually early Apr. Exceptionally the first f. in 1980 arrived on 18 Mar. Autumn peak 60 Tarn Woods on 28/9/81. Nine m. present in Dec 1980 with small numbers wintering 1989-90. Ringing recoveries Holmes gave details of a m. ringed in Apr 1954 returning in Apr 1957 and 1958. A m. ringed Apr 1954 recovered Settle 7 km WSW on 21/10/54.	
Brambling (<i>Fringilla montifringilla</i>)	Scarce Au W (Sp.)
Passage migrant and winter visitor to Tarn Woods. In considerable numbers in good beech mast years e.g. 50 Nov-Dec 1976, 300 Nov 1983, 80 on 27/11/85. Latest date a m. in breeding plumage feeding with chaffinches 15/5/78. Earliest date 2 on 8/10/82. Other notable numbers 100 Tarn Woods on 11/1/77. Usually do not stay long unless there is a heavy beech mast crop.	
Greenfinch (<i>Carduelis chloris</i>)	Common B Sp Su Au (W)
Breeding summer visitor. Tarn Woods 1-4 prs (Holmes, 1960), 4-5 prs BTO Census 1966-67. The earliest date of 24 Feb given in Holmes, 1960 does not specify the year. Holmes gives one winter record 20 Tarn House from 13/12/58 to 10/2/59. Recent winter records 1 on 24/11/82, 1 on 22/11/87 and 3 on 7/12/87, and 4 Tarn Woods on 26/12/89.	
Goldfinch (<i>Carduelis carduelis</i>)	Common (B) Au W Sp
Irregular breeder, with influx in autumn-winter. Probably bred on the estate 1977 and bred successfully in Tarn Woods in 1984 (prs seen 1970, 1972, 1975, 1977, 1978, 1988-1990). Winter and spring records 3 Malham Moor on 11/2/73, 6 at the Tarn 7/1/81, 1 Tarn Woods on 19/1/82. Autumn/winter records 100 High Trenhouse on 19/9/76, 40 Malham Moor Nov/Dec 1979, 50 Malham Tarn in Nov 1981, 1 Tarn Woods 12/12/81, 30 at the Tarn 13/10/83, 55 Tarn House lawn 13/10/87.	
Siskin (<i>Carduelis spinus</i>)	Scarce Sp Au
Passage migrant in Feb-Apr and Sept-Oct with up to 20 birds present. Earliest date 5 on 17/9/77 with the latest date 22/4/82. The only record outside this period is 'a pair was feeding on the ground at Malham Tarn on 6th June 1966.' (Mather, 1986)	
Linnet (<i>Carduelis cannabina</i>)	Scarce (B) Sp Su Au
Summer visitor and passage migrant in spring and autumn in small numbers. BTO Census Fen 2 prs 1966, 1 pr 1967; Tarn Close 1 pr 1966, none 1967. It may have bred Tarn Fen 1980. One pr 1989 Tarn Moss. In 1990 single prs Tarn Moss and Waterhouses. Probably breeds Darnbrook Plantations. Earliest date 9/4/89. Latest date 16/9/90.	
Twite (<i>Carduelis flavirostris</i>)	Common B Sp Su Au
Common breeding bird on Fountains Fell (1975 — 6 prs, 1976 — 10 prs, 1978 — 40 prs) but irregular Tarn Moss (1964, 1974, possibly 1982 and 2 prs in 1989 & 1990). Earliest arrival 15/3/78, usually main arrival is end Mar-early Apr. Large autumn flocks in Aug-early Oct. Latest 20/10/78. Maximum in autumn 100 Malham Moor mid Aug 1975, 150 High Trenhouse on 24/8/76, 200 Malham Tarn on 27/9/78, 150 Mastiles Lane on 13/8/81, 120 Capon Hall on 10/9/83, 100 Malham Tarn 15/9/83, 180 near Malham Tarn 6/8/85.	

Redpoll (<i>Carduelis flammea</i>)	Common B Sp Su Au (W)
Breeding summer visitor on Tarn Fen, Tarn Woods and Darnbrook Plantations. BTO Census 10 prs Tarn Woods and 4 prs Fen in 1966. Earliest record 5/4/59, latest 7/1/89. Autumn maximum 50 Tarn Fen 26/9/84. Two winter records of single birds near the Tarn on 6/12/83 and 12/1/91.	
Common Crossbill (<i>Loxia curvirostra</i>)	Very rare
Up to 10 in Tarn Woods 1–18/8/53 and 4–5/9/53 (Holmes, 1960). 1 Tarn Woods on 2/1/85 and 8 on 3/1/85. Influx in 1990 with 14 bird days, from 13/7 to 2/11 max of 5 on 13/7.	
Scarlet Rosefinch (<i>Carpodacus erythrinus</i>)	Very rare
One singing Tarn Fen on 22/6/89, only record (BS).	
Bullfinch (<i>Pyrrhula pyrrhula</i>)	Common (B) Sp Au (W)
Irregular breeder and passage migrant. Single birds on 4/6/10 and 25/5/58 (Holmes, 1960) suggest breeding. BTO Census recorded a single pr in Tarn Woods in 1966 and 1967 with three prs breeding in 1977. One Westside House 6/4/87 and 2 Tarn Woods 21/10–22/11/87. 2 on 17/10/89 and 3 on 18/10/89. Up to 7 from 21/10 to 18/11/90 with 1 on 23/12/90. Maximum counts 10 on 29/11/77 and 15/12/77.	
Hawfinch (<i>Coccothraustes coccothraustes</i>)	Very rare
Four Tarn Woods on 4–9/8/59 (Holmes, 1960), only record.	
Lapland Bunting (<i>Calcarius lapponicus</i>)	Very rare
One Tarn Fen with reed buntings on 30/10/88.(BS)	
Snow Bunting (<i>Plectrophenax nivalis</i>)	Rare W
Winter visitor usually in small numbers, probably under recorded. All singles except where stated Capon Hall 21/12/57, 2 there 9/1/60, 20 near Tarn on 26/2/60, 30 on 6/2/64. On road between Low Trenhouse, and Darnbrook 10/1/74, 16/11/74, 10 on 11 & 14/12/74, 20 Malham Tarn 7/12/74, 2 Malham Moor 7/12/80, Fountains Fell 27/1/81.	
Yellowhammer (<i>Emberiza citrinella</i>)	Very rare
Two over Great Close Mire on 21/3/54, 1 on 13/3/74.	
Reed Bunting (<i>Emberiza schoeniclus</i>)	Scarce (B) Sp Su Au (W)
Summer visitor, irregular breeding bird on Tarn Fen with occasional winter records. Arriving Mar–Apr and leaving Aug–Sept. 1 pr most years (Holmes, 1960), BTO Census 3 prs 1966 and 5 prs in 1967, 6–8 prs on the Fen 1978, not recorded as breeding 1987, bred 1989 and one singing there 1990. Winter records 2 Rough Close Farm on 14/11/75, Rough Close Farm m. 6/2/76 and 12/12/76, with one there on 25/1/80.	

ACKNOWLEDGEMENTS

We are grateful to the people who live on Malham Moor who drew our attention to unusual birds and supplied information on the farming and habitat changes since 1960, especially E. Jackson, M. V. Bell, M. Baily, S. Pemberton, S. Ralph, G. Taylor and P. Wilkinson. Thanks are also due to Trevor Williams who carried out ringing on Malham Tarn Fen and in doing so has drawn attention to the less obvious breeding birds and skulking migrants, and to D. Clements for preparing the map.

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APPENDIX 1 First Recorded Dates

Red Necked Grebe	1979	Ruff	1978
Bittern	1985	Jack Snipe	1978
Flamingo	1978	Great Snipe	1862
Greylag Goose	1971	Wood Sandpiper	1983
Barnacle Goose	1971	Red-necked Phalarope	1965
Wood Duck	1989	Great Skua	1985
Gadwall	1982	Kittiwake	1986
Red-crested Pochard	1972	Sandwich Tern	1990
Ring-necked Duck	1990	Collared Dove	1967
Red-breasted Merganser	1974	Long-eared Owl	1982
Ruddy Duck	1984	Lesser Whitethroat	1966
Hen Harrier	1970	Firecrest	1988
Montagu's Harrier	1968	Willow Tit	1974
Goshawk	1982	Jay	1967
Osprey	1985	Rose-coloured Starling	1979
Hobby	1970	Siskin	1977
Red-legged Partridge	1986	Linnet	1966
Stone Curlew	1895	Twite	1964
Grey Plover	1972	Scarlet Rosefinch	1989
Purple Sandpiper	1906	Lapland Bunting	1988

APPENDIX 2 Changes in status and distribution

Some species have altered their status since Holmes (1960). The reason for the change in status is clear in some cases but is still a matter of conjecture in others:

Shoveler	bred 1963–76 no longer breeds decrease in autumn	reason not known
Sparrowhawk	resumed breeding 1970 after a gap of 17 years	recovery from pesticides
Oystercatcher	colonised 1978	increased inland breeding

Appendix 2 (continued)

Black-headed Gull	no longer breeds bred until 1967	
Sand Martin	no longer breeds	national decline due to drought in their wintering area (Mead 1984, 1985)
Whitethroat	no longer breeds	as for Sand Martin (Marchant 1985)
Garden Warbler	colonised probably in last decade	suitable habitat now present
Wood Warbler	confirmed breeding 1989	
Pied Flycatcher	confirmed in 1978 and 1987	
Marsh Tit	last bred 1970 last recorded 1975	
Nuthatch	first bred 1971	
Goldfinch	probably bred 1977 confirmed breeding 1984	
Linnet	two prs 1966	
Twite	not mentioned in Holmes 1960	

APPENDIX 3 Earliest and latest dates for summer migrants

	<i>Earliest date</i>		<i>Latest date</i>	
Common Sandpiper	21 April	(1971)	13 August	(1989)
Cuckoo	29 April	(1977)	1 September	(1987)
Swift	6 May	(1989)	21 August	(1990)
Sand Martin	14 April	(1981)	20 September	(1983)
Swallow	11 April	(1980)	20 September	(1983)
House Martin	28 April	(1987)	25 November	(1960)
Tree Pipit	10 May	(1980)	16 August	(1988)
Yellow Wagtail	16 April	(1987)	16 September	(1990)
Redstart	4 April	(1980)	15 September	(1988)
Whinchat	1 May	(1979)	15 October	(1983)
Wheatear	10 March	(1977)	24 October	(1982)
Ring Ouzel	16 March	(1973)	30 October	(1988)
Garden Warbler	8 May	(1988)	5 August	(1989)
Blackcap	6 May	(1990)	16 September	(1989)
Wood Warbler	24 April	(1978)	13 August	(1982)
Willow Warbler	9 April	(1989)	16 September	(1990)
Spotted Flycatcher	1 May	(1990)	12 October	(1981)
Pied Flycatcher	6 May	(1990)	13 August	(1981)

CORRECTIONS TO THE BIRDS OF YORKSHIRE

JOHN R. MATHER

Two records published by me in 1986 are in need of clarification and correction. I have been asked by H. O. Bunce to clarify the situation pertaining to the record of three skeins of Pink-footed Geese *Anser brachyrhynchus* flying over Easington on the improbably early date of 5 August 1948 (page 114). This was not in fact his record as stated by Chislett in the Yorkshire Naturalists' Union Ornithological Report for that year. The incident was related to Bunce by a colleague who lived in the area and who knew the geese well. He said that he 'had three skeins of Pinks over last night' and Bunce included the report in his notes to Chislett who published the record with the initials HOB. Bunce spoke to Chislett who said he would publish a correction in the next report but this was never done and he repeated the error in his *Yorkshire Birds* in 1952 (page 178). I extracted the record for *The Birds of Yorkshire* in 1986 and because of the reliability of the presumed observer (HOB) assumed it to refer to an exceptionally early record. It is impossible to guess what the birds may have been as the observer was very familiar with the Pink-footed Goose skeins which regularly passed over the area at that time; however, 5 August is a very early date, at a time when the geese would still be in Iceland having just completed their wing moult. It is thus safer to delete the occurrence from the records.

The story of a skua killed with a stick whilst attacking chickens at Steeton Reservoir, near Halifax on 17 September 1942 makes interesting reading. It was identified as an Arctic Skua *Stercorarius parasiticus*, an unlikely species to attack chickens, and taken to the Keighley Museum where it was eventually labelled as a Great Skua *Stercorarius skua*. After doubts as to its correct identity had been raised by the curator J. Ogden and C. D. Robinson, Chislett inspected the mounted bird on 2 October 1953 and pronounced it to be a Pomarine Skua *Stercorarius pomarinus*. In his correction in the YNU Ornithological Report for 1953 Chislett wrote: '...and found it to be a typical, dark form Pomarine Skua except that the central tail-feathers were not completely grown nor twisted; probably it was a juvenile. Mr. Alfred Hazelwood agrees the bird is a Pomarine Skua.'

It can only be presumed that Hazelwood did not see the specimen, otherwise he would surely have correctly identified it. Again, having assumed that Chislett had finally sorted out the question of the bird's identity, I published the details in *The Birds of Yorkshire*. In 1988, whilst sorting through the collections at the Keighley Museum, Miss M. M. Hartley took some measurements of the supposed Pomarine Skua and was not convinced that it was in fact that species. She wrote to me on 5 August 1988, asking whether or not I had actually seen the specimen as I had said in my book that it had 'finally been identified correctly by Chislett...' I collected the specimen shortly afterwards and it was in fact a juvenile Great Skua in very dark sepia-brown plumage with no pale hackles or edges to the mantle feathers. The legs and feet were far too large for Pomarine but the bill was very small, this latter feature combined with the uniformly dark plumage obviously prompting Chislett to reach his erroneous conclusion. It seemed logical to me when I read accounts of the record that as it had at first been thought to have been an Arctic Skua and then a Great Skua, a dark phase Pomarine Skua was feasible and that the 'final' identification had been correct. I compared the bird with skins at the British Museum of Natural History, sub-department of Ornithology at Tring and it matched three very dark juvenile Great Skuas from the Shetland Isles.

TWO RARE SCUTTLE FLIES (DIPTERA, PHORIDAE) FROM YORKSHIRE, INCLUDING ONE NEW FOR BRITAIN

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In July, August and September 1990 Jean Johnston and Dr Michael Usher (University of York) operated some water traps in eleven woods on the Escrick Estate, North Yorkshire. The Phoridae were sent to me for identification. Among the 27 species represented in these collections were two rare species of *Megaselia* Rondani. One has not been collected in Britain since 1907 and the other is new to the British List. These are detailed below.

Megaselia angularis (Schmitz 1924) (Fig. 1)

In July 1990 four males and two females were collected in Gamble's Rush Wood (Grid ref. 44/616398); one male in Winter's Plantation (44/651415); and one male in the Nursery Plantation (44/645413). These are the first British records for this species, which had previously been recorded from Austria, Czechoslovakia, Finland, Germany, Poland and Portugal.

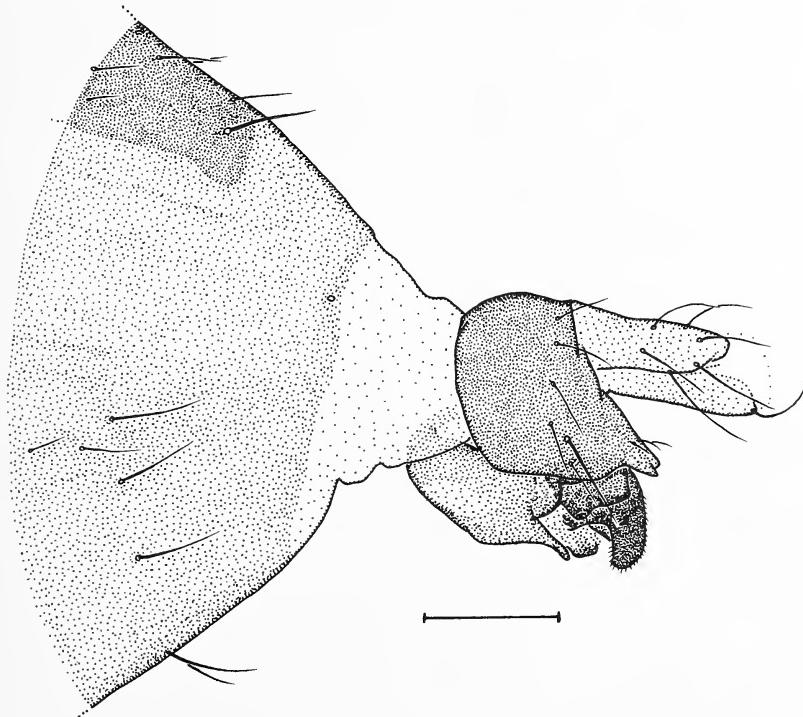


FIGURE 1

Megaselia angularis male hypopygium viewed from left side (scale bar = 0.1 mm)

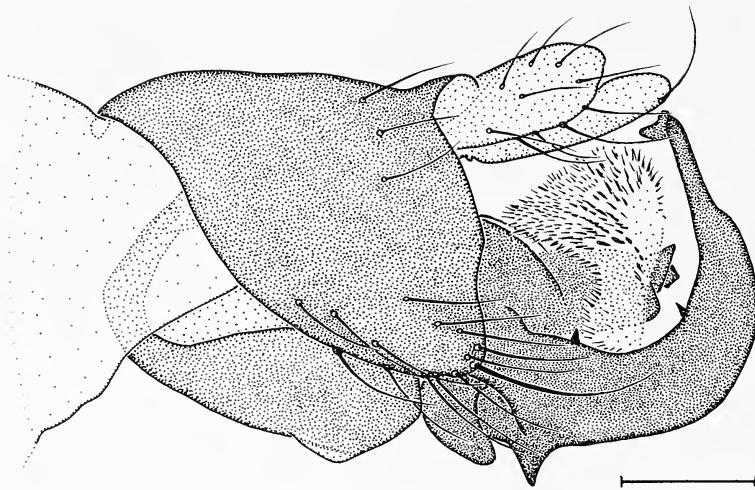


FIGURE 2
Megaselia barbulata male hypopygium viewed from left side (scale bar = 0.1 mm)

This species is covered by the incomplete keys to the Palaearctic *Megaselia* species, running out in 'Abteilung IV, Erste Reihe' (Schmitz 1958) or 'Abteilung V' (Schmitz and Delage 1974), depending on the length of the costa. Schmitz (1958, fig. 283) illustrates the right face of the male hypopygium.

In the keys to the British *Megaselia* (Disney 1989) *M. angularis* runs to couplets 137 or 139 on page 26. The somewhat yellow basal half of the hind femur will distinguish it from *M. fusciclava* Schmitz. The posterior lobe of the left side of the hypandrium is bare, in contrast to the latter species and *M. tergata* (Lundbeck). The left face of the hypopygium is shown in Fig. 1, for comparison with the figures of these other two species.

Megaselia barbulata (Wood 1909) (Fig. 2)

Up until now only a single male of this distinctive species, the holotype collected in Stoke Wood, Herefordshire, in July 1907, has been recorded in Britain. However, it has since been reported from Austria, Germany, Denmark, Finland, Portugal and Spain.

At the time of writing my Handbook I had no specimen available, other than the holotype. The latter's hypopygium was not in a state suitable for illustration.

In July 1990 four males were obtained in the Nursery Plantation. I illustrate the striking hypopygium, with its enlarged penis complex, in Fig. 2. This will supplement the recognition characters cited in couplet 15 of my key (Disney 1989, p. 14).

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POPULATION CHANGES IN THREE BUTTERFLY SPECIES IN NORTH LANCASHIRE 1979 TO 1990

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SUMMARY

This paper details the observed changes in the populations of Brimstone (*Gonepteryx rhamni*), Small Tortoiseshell (*Aglais urticae*) and Peacock (*Inachis io*) butterflies over a 12 year period at two nature reserves in North Lancashire. These three species all overwinter as adults, hibernating in the autumn before emerging in spring. During the period under study all three species suffered a marked decline, all at the same time, followed by a recovery three years later in Small Tortoiseshell and peacock, but there is little sign after five years of a marked recovery in the brimstone. The possible causes of the decline and subsequent recovery are considered.

INTRODUCTION AND METHODS

Populations were sampled using the methods of the ITE National Butterfly Monitoring Scheme (Pollard 1977; Pollard *et al.* 1986). The same route was surveyed weekly from April to September throughout the period whenever weather conditions permitted. To standardise recording, counts were only made in the middle of the day during sunny weather with the temperature above 13°C or in any conditions other than rain when above 17°C. Pollard *et al.* (1986) have shown that this monitoring technique provides a reliable assessment of population changes in butterflies. Recording throughout was mainly done by the author at Leighton Moss and at Gait Barrows by Tony Aldridge the NCC Warden.

The transect at Leighton Moss RSPB Reserve mainly covers the dry edges of the reed-bed where there are extensive stands of plants used for nectar feeding by these three species, including Knapweed (*Centaurea nigra*), Purple Loosestrife (*Lythrum salicaria*), Creeping Thistle (*Cirsium arvense*) and Hemp Agrimony (*Eupatorium cannabinum*).

Large stands of Nettle (*Urtica dioica*), the host plant of both Peacock and Small Tortoiseshell, occur in many areas, while both Purging Buckthorn (*Rhamnus catharticus*) and Alder Buckthorn (*Frangula alnus*), the foodplants of brimstone, were locally frequent in the area. The transect at Gait Barrows NNR covers many of the rides and paths within the limestone woodland and pavement areas. Although rich in flowers as described for Leighton, there are few food plant species, although many occur close by.

An index of abundance was calculated for both the spring and summer generations by adding together the weekly counts during the flight periods. Pollard *et al.* (1986) and Pollard (1988) present evidence that the index is a measure of relative abundance, not an estimate of population size and that counts are very little influenced by weather during the count. Although there were some differences in the flight periods of the three species, in each the spring flight was on the wing mainly from April to early June and the autumn flight from late June to early September. The flight periods varied somewhat from year to year depending on weather conditions.

RESULTS AND DISCUSSION

The index of abundance obtained for each flight period is shown in Table 1 while the weather details during the same period are shown in Table 2.

Prior to 1985 all three species showed some marked fluctuations in numbers. No attempt has been made to correlate changes with weather during this period, indeed the sample size is probably too small to undertake such an analysis. However as might be expected there are indications that the highest numbers occurred during periods of low rainfall and above average temperatures although in only one year did all three species follow a similar pattern; this was in the very dry warm spring of 1984 when a high population index was recorded simultaneously for each species. Also there were indications that the lowest numbers occurred

TABLE 1

Spring and summer index of Brimstone, Small Tortoiseshell and Peacock Butterflies at Leighton Moss (LM) and Gait Barrows (GB) Nature Reserves 1979–1990

	Brimstone				Small Tortoiseshell				Peacock			
	Spring LM	Spring GB	Summer LM	Summer GB	Spring LM	Spring GB	Summer LM	Summer GB	Spring LM	Spring GB	Summer LM	Summer GB
1979	13		20			53		84		73		104
1980	31		41			141		221		54		235
1981	18		27			92		142		47		105
1982	37	12	56	94		71	3	241	52	136	33	201
1983	47	51	59	40		75	7	171	10	171	64	142
1984	105	46	95	32		134	3	125	21	318	48	99
1985	95	57	11	41		51	2	64	32	175	30	95
1986	10	3	2	20		20	0	9	0	15	6	2
1987	4	4	2	8		14	0	26	7	2	1	0
1988	3	1	5	3		69	2	298	22	12	6	29
1989	3	0	1	2		38	0	285	22	22	9	247
1990	5	2	5	3		151	4	666	48	173	58	645
												109

TABLE 2

Rainfall, average maximum temperatures and sunshine, Leighton Moss, North Lancashire 1979–1990

	Rainfall mm		Average Maximum Temperature °C		Hours of Sunshine	
	Apr/May	Jul/Aug	Apr/May	Jul/Aug	Apr/May	Jul/Aug
1979	184.6	189.2	13.4	14.6	290.3	300.7
1980	36.9	206.2	16.2	17.1	474.5	290.5
1981	132.9	172.9	13.8	17.5	323.2	296.4
1982	103.6	187.8	13.2	16.6	434.7	342.0
1983	172.9	101.4	11.4	21.3	288.6	436.5
1984	93.7	127.2	13.7	23.0	438.5	486.3
1985	243.0	340.0	13.8	16.1	290.4	287.8
1986	231.5	129.7	12.2	16.3	328.8	270.8
1987	118.0	216.0	13.7	17.0	358.4	340.1
1988	128.5	269.5	14.2	16.1	370.5	301.1
1989	92.0	122.0	13.7	18.8	445.4	478.7
1990	92.0	77.0	13.6	20.7	453.6	408.4
Ave.	135.8	178.2	13.6	17.9	374.7	353.3

Note Rainfall and temperatures were recorded at Leighton Moss; sunshine data are from Morecambe, 6 miles south

during cold wet periods, although again only in one year, the cold wet spring of 1979, was a low population index recorded in all three species simultaneously.

The start of the major decline was first detected at Leighton Moss in the autumn of 1985 when all three species recorded their lowest population index to date, with the decline being the most marked in Brimstone and Small Tortoiseshell. At Gait Barrows there was no real suggestion of a decline that autumn, possibly because the transect area at Gait Barrows is much more sheltered than Leighton and butterflies tend to fly there more frequently on days of marginal weather. All three species recorded an unprecedented low population index in the spring and summer of 1986 at both sites and continued through 1987 when only ten Brimstone and one Peacock were recorded during the summer flight that year. The rapid population decline of all these three species at the two sites suggests that a common factor was responsible. Habitat change is an unlikely reason for the decline as no marked habitat changes took place at either of these sites during that year. Other local observers reported a similar decline throughout North Lancashire and adjoining areas of Cumbria, again indicating that habitat change was not a factor.

Close examination of the weather conditions at the time of the population decline strongly suggests that the decline was weather related (Table 2). The late summer flight in July and August 1985 occurred during the wettest period recorded in the twelve years with 340 mm of rain compared to the average of 178 mm over the 12 years. It was also cold with an average maximum temperature of 16.1°C compared with 17.9°C for the 12 years. Hours of sunshine were also below average with only 287 hours during July and August compared with an average of 353 hours. The following spring flight period also coincided with wet weather when 231 mm of rain fell during April and May compared to an average of 135 mm. The temperature was also cold during April and May with an average maximum of 12.2°C compared with an average of 13.6°C over the twelve year period. Again hours of sunshine were lower during April and May with 328 against an average of 374 hours.

It does appear that the combination of very poor weather over two successive flight periods was the reason for the decline. In the late summer flight periods possibly very few butterflies emerged and those that did had little opportunity to feed on nectar to prepare for hibernation. Larval and pupal survival may also have been adversely affected by the cool wet weather. Poor weather the following spring compounded the problem probably by inhibiting courtship, mating and egg laying.

By the spring of 1988 there were the first signs of recovery in the populations of both Small Tortoiseshells and Peacocks and by the autumn, Small Tortoiseshells were recorded in pre-crash numbers. It took another year for Peacock populations to recover completely but Brimstones still continued at a very low population level throughout this period.

The recovery was very slow, taking three years in the Small Tortoiseshell and four in the Peacock, but even after five years there is no real sign of recovery in the Brimstone. The first two species are widely distributed within Britain and are to some extent migratory (Emmett & Heath 1989), so providing the opportunity for the area to be recolonised. It would be interesting to know the extent of the area where butterflies suffered a similar decline following the poor weather of 1985. Certainly southern Cumbria suffered to the same extent and the recovery has taken even longer there (Bill Kydd pers. comm.). Similar declines were also recorded on many Scottish butterfly transects (Dr James Cadbury pers. comm.).

One interesting possibility is that the parasites of these species may also have suffered a similar severe decline. The Ichneumonid *Phobocampe confusa* (Thomson) is host specific to Peacock and Small Tortoiseshell (M. Shaw pers. comm.; Shaw 1990) and when present causes considerable mortality to the larvae, although it is not known if this parasite occurs in the area. The build up in 1989 and especially 1990 to unprecedented levels might possibly be due to low parasite levels.

The Brimstone is much more restricted in its distribution, mainly a southern species with an outlying population within the Southern Lakes. With no breeding populations immediately to the south or east of the area to provide immigrants, and with the decline stretching across into at least southern Cumbria, there has probably been no immigration and the population is still

struggling to build up from the very few individuals that survived the decline.

Of the other 18 species of butterflies regularly monitored on the two transects none showed a similar pattern of decline. All fly later in the season and overwinter either in the egg or larval stage.

ACKNOWLEDGEMENTS

Many thanks to Tony Aldridge, Warden of Gait Barrows NNR, for allowing me to use his census details and to Dr James Cadbury and Dr Tim Melling for commenting on an earlier draft of this paper. David Wrigley, Chief Engineer Lancaster City Council, kindly supplied the sunshine data.

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BOOK REVIEW

A Field Key for Classifying British Woodland Vegetation Part 2 by R. G. H. Bunce. Pp 95. HMSO, London. 1989. £7.95.

This booklet, and its associated earlier volume, are reflections of the constant desire to classify things into appropriately labelled categories. Whereas Part 1 of this key (published in 1982) classified individual 200 m² plots of woodland into identified vegetation types, this volume uses the range of variation of species composition found within a number of plots in any one woodland to classify the woodland as a whole into one of 15 types. Indicator species, from both the ground vegetation and canopy species, are employed in a series of keys to determine the designated woodland category, and then descriptive information about the characteristic species, individual plot vegetation types present and very limited information about the distribution and certain environmental parameters appropriate to the woodland types is provided.

The use of a range of indicator species in keys of this sort is a relatively straightforward way of classifying whole woodlands, and could have use when the woodland as a whole is the focus of ecological interest. However, to have to take 16 vegetation samples, each of 200 m², before starting to use the keys does not make this a simple task. Full species lists including grasses, ferns and mosses, need to be completed for all 16 plots as the primary field task, whereas using the keys is essentially the final step that need not be field based, belying the booklet's title. As regards the production of the booklet, I did not always feel that the introduction section was clearly written, and was rather disconcerted at the number of typographical errors encountered in the example on pages 12–14; I hoped that these were not continued in the keys themselves. I also felt that most of the photographs, showing woodlands framing the distant horizon, did more to demonstrate the surrounding farmland than the ecological character of the woodland in question, and that the photographs could usefully have been omitted.

Overall, an approach to classification of interest, and possibly of use to those ecologists and conservationists who need to categorise a woodland in relation to others throughout Britain, but not enhanced by the production quality of this booklet.

RECENT CETACEAN RECORDS FROM YORKSHIRE WATERS

C. A. HOWES

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The occurrences of cetaceans in Yorkshire waters have been collated and reviewed in Clarke and Roebuck (1881), Grabham (1907), Fraser (1956), Spalding (1966), Clegg (1980) and Delany (1985). Spalding's (1966) study gives the most detailed historical review though Delany (1985) provides the best interpretation of occurrences in the light of recent studies of status, seasonality and migratory patterns of cetaceans in the North Atlantic and British waters.

Subsequently there have been detailed reviews of the Yorkshire occurrences of minke whale (Howes *et al.* 1987), Yorkshire and other British occurrences of white whale (Howes 1990) and observations on the occurrence and behaviour of minke whale and fin whale off Flamborough (Allport 1989), and Limbert (1985) through critical analysis of historical literature provides clarification of the often misquoted 1863/4 occurrence in the Humber of a herd of northern bottlenose whales.

The following compilation assembles records of strandings and sightings made available since Delany (1985), and provides a more extensive review of the long-finned pilot whale stranding on the Holderness Coast in January 1985.

Records of harbour porpoise (*Phocoena phocaena*) are being incorporated in a separate study of their seasonality, herd size and status changes (Howes in prep.).

Minke Whale (*Balaenoptera acutorostrata*)

- 13/7/1982 Hilston (TA/3033). A 7.9 m adult male stranded (Howes *et al.* 1987).
- 29/4/1985 Broomfleet Island (SE/8826). A 5.18 m specimen stranded after temporarily stranding in the Trent at Burton-on-Stather (SE/8618) and the Ouse at Goole Fields (SE/7521) (Howes *et al.* 1987).
- 25/10/1986 Flamborough Head. 1 estimated to be 6 to 9 m in length repeatedly leaping almost clear of the water, seen by J. C. Lamplough (Allport 1989).

Fin or Common Rorqual Whale (*B. physalus*)

- 10/8/1985 Flamborough Head. 1 feeding about half a mile off shore was watched for about 35 minutes by P. A. Lassey and A. Allport (Allport 1988).

Beluga or White Whale (*Delphinapterus leucas*)

- 12/6/1987 1 seen from fishing boat 24 km off Scarborough (Howes 1990).
- 14/6/1987 1 seen from yacht 800 m off Whitby harbour mouth (Howes 1990).

Killer Whale (*Orcinus orca*)

- 9/11/1990 1 male and 2 females or young seen moving north about 3 km off Hornsea (*pers. comm.* W. F. Curtis).

Long-finned Pilot Whale (*Globicephala melaena*)

The mass stranding along the Holderness coast in January 1985 was reported in the *Holderness Gazette* (1985) and in the South Holderness Countryside Society journal *Holderness Countryside* by Bellamy (1985), Rowell (1985) and Walters (1985).

The event involved at least 36 animals, including fully grown bulls, pregnant and lactating cows and young calves.

The majority of animals stranded at about midday on 15 January during gale force on-shore winds and driving snow on the stretch of beach between Holmpton and the Easington Gas

terminal, the majority between Holmpton and Out Newton. Members of the Sea Mammal research unit examined 33 specimens, of which 14 were males, ranging from 2.86 m to 5.80 m and 19 were females, measuring from a 2.19 m calf to a 4.70 m adult cow. Of the females, five were pregnant and three were lactating, indicating the presence of deserted calves.

On the 18th, in addition to counting 34 beached animals, a further two animals were seen offshore and on the 21st another animal stranded alive near Donna Nook south of the Humber mouth. Photographs by L. Kirk, A. Burnham, D. Earle and D. James appeared in the *Hull Daily Mail*, 16/1/1985, *Holderness Gazette*, 25/1/1985, and *Holderness Countryside* (1985).

White-beaked dolphin (*Lagenorhynchus albirostris*)

- 13/1/1985 Easington. A 1.82 m specimen found dead. Photographs by J. Cudworth examined by CAH.
 14/8/1986 North Bay, Scarborough. A 2.45 m male found dead. Photograph in *Scarborough Mercury* 16.8.1986.
 14/8/1986 Cornelian Bay. A 2.74 m male found dead (*Scarborough Mercury*, 16.8.1986).
 6/8/1987 North Bay Scarborough. One stranded (*Scarborough Evening News* 12 & 13/8/1987).
 11/8/1987 Cornelian Bay. One stranded (*Scarborough Evening News*, 12 & 13/8/1987).
 -/8/87 Reighton Gap. One stranded (*Scarborough Evening News*, 12 & 13/8/1987).
 -/2/1988 Battery Parade, Whitby. One stranded (*Whitby Gazette*, 12.2.1988).
 25/8/1988 Off Scarborough. Two seen at a few metres range from a fishing boat 5 miles off Scarborough Castle. Photograph by E. Horsley examined by CAH.

White-sided Dolphin (*L. acutus*)

- 17/2/1986 Filey. A 2.6 m specimen found dead. Photographs examined by C. I. Massey. (*Scarborough Mercury*, 16/8/1986).

Unidentified Dolphins

- /6/1985 Grimston. A 91 cm specimen (? young porpoise) found by coastguards at the foot of the cliff (*Hull Daily Mail*, 6/6/1985).
 13/7/1985 Hornsea. One seen off shore (M. Mourby pers. comm.).
 20/8/1985 Grimston. One seen off shore (M. Mourby pers. comm.).
 -/2/1986 Filey. Two dolphins stranded, one identified as *L. acutus* (*Scarborough Mercury* 16/8/1986).
 -/4/ 1986 Cayton Bay. One stranded (*Scarborough Mercury*, 16/8/1986).

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COLEOPTERA RECORDS FOR YORKSHIRE: A REVIEW AND UPDATE

R.J.MARSH

This paper updates previous Coleoptera reports which have appeared in *The Naturalist* in recent years;

- Part 1: Carabidae by J. H. Flint
 - Part 2: Haliplidae–Scolytidae by J. H. Flint
 - Part 3: Staphylinidae (Aleocharinae) by M. L. Denton
- Entomological Reports for 1984–1986, **113**: 69–72 (1988) by J. H. Flint
- Entomological Reports for 1988–1989: Staphylinidae (Aleocharinae), **115**: 97–102 (1990) by M. L. Denton.

This report deals with the Staphylinidae, excluding the Aleocharinae (further papers upon which will be dealt with by M. L. Denton in due course). The records which follow are an amalgamation of data already appearing on the files of the Y.N.U. which are worthy of mention here, as well as data from my own recording system (built up since 1980), the records of the Sorby Society, in addition to a continuous stream of records and observations from the following whose initials appear in the list, and to whom I extend my thanks: R. B. Angus, J. T. Burn, R. Crossley, M. L. Denton, W. A. Ely, J. H. Flint, S. Gardner, P. M. Hammond, R. J. Hunt, C. Johnson, D. A. Lott, D. Maude, K. Payne, and E. J. Smith. My own records are initialled RJM.

Besides listing new county and vice-county records I have also made mention of species which have not, to our knowledge, been recorded for very many years, and of course, some interesting records which have been held by individuals without having been passed on to the Y.N.U. recorders. There are also instances of species having been recorded, which as a result of further taxonomic work have been split, or have otherwise been confused, e.g. *Quedius curtipennis* Bernhauer/*fuliginosus* (Gravenhorst), *Anotylus mutator* (Lohse)/*sculpturatus* (Gravenhorst), *Xantholinus jarrigei* Coiffait/*tricolor* (Fabricius), and *Olophrum fuscum* (Gravenhorst)/*piceum* (Gyllenhal).

In the following list, (*) denotes a new vice-county (VC) record, whilst (+) denotes a record new to Yorkshire (using the Watsonian vice-county boundaries).

Olophrum fuscum (Gravenhorst). (63) Shirley Pool (44/51), 5.vii.86; RJM. The first of five recent records since Heath's old record for Ackworth. Often confused with *O. piceum*; see Hammond (1970).

Arpedium brachypterum (Gravenhorst). (62) Rosedale Moor (44/79), 6.x.87; SG. In pitfall traps on Calluna heath. The first VC62 record since the 1931 record for Burton Head.

Phyllodrepoidea crenata (Gravenhorst). (*63) Drop Clough (44/01), 23.ix.87; MLD. (*64) Grass Wood (34/96), 3.ix.88; RJM.

Lesteva monticola (Keisenwetter). (*63) Blackmoorfoot (44/01), 26.x.81; MLD.

Acrolocha sulcula (Stephens). (*65) Semerwater (34/98), 20.viii.88; RJM. Found in sheep dung but elsewhere recorded from horse dung and vegetable refuse.

Omalium allardi Fairmaire & Brisout. (63) Blackmoorfoot (44/01), 1985; MLD. The first record since being noted near Nostell by "JWC" (Carter?) in 1905.

O. exiguum Gyllenhal. (*63) Melton Wood (44/50), 10.v.87; RJM. Taken from grass heaps and the first traceable Yorkshire specimen since the Scarborough record of W. W. Fowler.

O. oxyacanthae Gravenhorst. (*63) Elland Gravel Pit (44/12), 3.xii.83; MLD, and Melton Wood (44/50), 6.ii.84; RJM, the latter found by sieving deep leaf litter.

Phloeonomus pusillus (Gravenhorst). (*64) Timble Ings (44/15), 27.ix.81; RC. Only the second recent Yorkshire record, all earlier ones being more than 60 years old.

Xylodromus concinnus (Marsham) (*65) Felham Ranges (45/00), 8.viii.90; MLD. The first VC65 record for this widespread and fairly common species.

X. depressus (Gravenhorst). (*61) North Duffield (44/63), 6.vii.87; RJM. Found in haystack refuse. (*63) Eggborough (44/52), 4.vi.83; RJM. In leaf litter.

Philorinum sordidum (Stephens). (62) Lockton (44/89), 10.v.89; WAE. The first VC62 record since Lawson's (undated) record for Scarborough.

Coprophilus striatulus (Fabricius). (64) Cawood (44/53), iv.90; KP, det. MLD. From pitfall traps. The first VC64 record since 1922 — a rarely encountered species in Yorkshire.

Bledius germanicus Wagner. (*63) Thorne Moor (44/71), 24.x.90; MLD, det CJ. Only 2 other Yorkshire records.

Ochthephilus aureus (Favel). (*63) Lindley Wood (44/20), 16.iii.86; EJS, det. CJ. This insect only found in Yorkshire on 4 previous occasions, all pre-1935.

Thinodromus arcuatus (Stephens). (64) Studley Park (44/26), 19.vi.89; RJM. Found in debris under rotting logs by the River Skell and the first known VC64 record since Ellis's 1888 Ingleborough capture. (62) Duncombe Park (44/68), 10.ix.85; RJM. The only previous VC62 records are for Scarborough (Hey) and Glaisdale (G.B. Walsh).

Carpelinus foveolatus (Sahlberg) (61) Beacon Ponds (54/41), 21.v.90; MLD (teste CJ). The third record for Yorkshire.

C. impressus (Boisduval & Lacordaire). (*61) Bubwith (44/73), 14.v.88; CJ. The third record for Yorkshire and rarely encountered.

C. subtilicornis (Roubaud). (*61) Bubwith (44/73), 14.v.88; RJM. Found on the banks of the River Derwent on bare mud. Most other records are from VC64 and the species was described as new to Britain in 1956. See Steel (1956).

C. zealandicus (Sharp). (+63) Parkgate, Rotherham (43/49), 13.vii.84; EJS. The first traceable Yorkshire specimen of this distinctive species, described as new to Britain in 1969; see Steel (1969). (*64) Studley Park (44/26) 14.vii.90; RJM. Found in vegetable refuse on the bank of the River Skell.

Thinobius bicolor Joy. (*64) Studley Park (44/26), 19.vi.89; CJ. On the banks of the River Skell. The only other traceable record is for Scarborough in the last century.

Aploderus caelatus (Gravenhorst). (62) Thirsk (44/58), 13.x.86; RJM. Found in roadside grass heaps and the first VC62 record since Yedingham in 1931. (63) Mellor Wood (44/11), 22.vii.86; MLD, and the first record for that vice-county since 1907.

Platystethus nodifrons Mannerheim. (+61) Aughton Ings (44/63), iii.89; MLD.det CJ. (61) Bubwith Bridge (44/73), vi.89; MLD, det CJ. specimens collected from *Glyceria* beds and the first known Yorkshire records of this nationally rarely recorded species (Hammond, 1971). (*64) Cawood (44/53), iv.90; KP det MLD. Taken from pitfall traps.

Anotylus maritimus (Thomson). (62) Robin Hood's Bay (45/90), 9.ix.89; MLD. Found on the strand line and the first since M.L. Thompson's undated Saltburn record.

A. mutator Lohse. (*61) Aughton Ings (44/63), 7.vii.87; RJM. Found in cow dung, this is one of an increasing number of records since the species was split from *A. sculpturatus* (Gravenhorst); see Hammond (1968). (*64) Studley Park (44/26), 19.vi.89; RJM. Again found in cow dung.

Stenus assequens Rey. (+65) Semerwater (34/98), 20.viii.88; RJM, MLD ,RBA, det. CJ. Numerous specimens found in flood refuse. This species is rare nationally and has been recorded only 8 times in Britain (Dorset, Surrey, Sussex, Somerset, and the New Forest).

S. bimaculatus Gyllenhal. (*65) Semerwater (34/98), 20.viii.88; PK. Found in flood refuse. The first VC65 record for this common and widespread species.

S. comma LeConte. (61) Rudston (54/16), 19.viii.89; MLD, and (61) North Duffield Carrs (44/63), 7.ix.89; MLD. The first VC61 records since Fordham's Bubwith record of 1914. (*63) Ravenfield Park (43/49), 6.vii.85; WAE, det. PMH.

S. formicetorum Mannerheim. (*63) Thorne Moor (44/71), 21.vi.90; MLD. In pitfall traps and only the third Yorkshire record.

S. fuscicornis Erichson. (*63) Rotherham (43/49), 12.v.88; WAE. Collected from garden vegetable refuse. (*62) Duncombe Park (44/68), 28.ix.87; RJM. One specimen from a sheep carcass (!).

S. melanopus (Marsham). (*61) Aughton Ings (44/63), 7.vii.87; RJM. The first Yorkshire record since Fowler noted it from Bridlington.

S. nitens Stephens. (*61) Hornsea Mere (54/14), 2.viii.88; RJM. Found by sieving reed litter at the edge of the Mere.

S. nigritulus Gyllenhal. (63) Sprotbrough (44/50), 28.x.87; RJM. The first VC63 record since H. H. Corbett's 1900 Askern capture.

S. nitidiusculus Stephens. (65) Semerwater (34/98), 20.viii.88; RJM. The first VC65 capture this century.

Euaesthetus laeviusculus Mannerheim. (*62) Kildale (45/70), 8.vii.87; SG. det. MLD. In pitfall traps set by the York University heather moors arthropod survey.

Lathrobium elongatum (Linnaeus). (61) Bubwith Bridge (44/73), 10.vi.89; RJM. Found in the ground litter in *Glyceria* beds and the first VC61 record since being noted from Hornsea Mere in 1859.

L. multipunctatum Gravenhorst. (*63) Niblum Quarry (43/58), 14.viii.82; WAE. The first record for Yorkshire for over 50 years.

L. quadratum (Paykull). (61) Bubwith Bridge (44/73), 22.v.90; MLD. Found in *Glyceria* beds and last recorded in 1917 by G.B.Walsh.

Sunius propinquus (Brisout). (*63) Blackmoorfoot (44/01), 1987; MLD. The third known Yorkshire record.

Lithocharis nigriceps Kraatz. (*65) Gillfield Wood (44/09), 7.v.89;MLD. A new record for this usually common and widespread inhabitant of dungheaps and vegetable refuse.

Astenus pulchellus (Heer). (63) Blacktoft Sands (44/82), 1.iv.88; MLD. Only the third Yorkshire record.

Rugilus erichsoni (Fauvel). (*63) Hall Dike (44/11), 26.xii.83; DM, det. MLD. (*61) Thornton Ellers (44/74), 25.ix.87; MLD & RBA. The last traceable record was from Askham Bog in 1907 (Hey).

Nudobius latus (Gravenhorst). (*64) Sawood (44/33), 27.xii.88; MLD.

Gyrohypnus fracticornis (Muller). This species has often been confused with *G. punctulatus* (Paykull). For the separation of the species see Freude *et al.* (1964) and Last (1981). The first authentic Yorkshire records that I have been able to trace are as follows: (62) Duncombe Park (44/68), 10.ix.87; RJM. Around old dungheaps. (63) Sprotbrough (44/50), 11.viii.87; RJM. In vegetable refuse. (64) Newton Ings (44/42), 1989; MLD. (65) Gillfield Wood (44/09), 7.v.89; MLD.

Xantholinus jarrigei Coiffait. This species has been confused in the past with *X. tricolor* (Fabricius); see Steel (1946) and Last (1950). The following can be confirmed: (*63) Sprotbrough (44/50), 6.vii.80; RJM. (63) Shirley Wood (44/51), 11.vii.86; RJM, both records from horse dung. Records of *X. tricolor* on the Y.N.U. files should therefore be treated with caution. Last (1950) states *X. tricolor* is an insect of wooded upland regions whereas *X. jarrigei* is found in lower, milder regions and is widely distributed in Britain.

Neobisnius villosulus (Stephens). (*63) Willow Garth (44/52), 29.iv.90; RJH. det. MLD.

Philonthus concinnus (Gravenhorst). (*61) Wheldrake (44/74), 7.ix.89; RJM & MLD. (*63) Blacktoft Sands (44/82), 17.ix.83; RJM.

P. cruentatus (Gmelin). (*63) Netherfield (43/48), 20.vi.85; WAE. Only the fourth Yorkshire record.

P. laminatus (Creutzer). (*65) Gillfield Wood (44/09), 7.v.89; MLD.

P. longicornis Stephens. (*63) March Haigh Reservoir (44/01), 18.iv.85; DM, det. MLD.

P. micantoides Benick & Lohse. (*61) Aughton Ings (44/63), 14.v.88, CJ. (*62) Burton Riggs Quarry (54/08), 29.iv.89; MLD.

P. nigrita (Gravenhorst). (*61) Allerthorpe Common (44/74), 5.viii.89; MLD. (62) Kildale (45/70), 3.vii.87; SG, det. MLD. In pitfall traps on *Calluna* heath; the first VC62 record since H. Britten noted it from Whitby in 1935. Apparently very rarely encountered.

P. parcus Sharp. (*61) Derwent Ings (44/63), 19.vii.87; RJM. A male specimen in carion.

P. quisquiliarus (Gyllenhal). (*62) Duncombe Park (44/68), 28.ix.87; RJM. In mud on the bank of the River Rye.

P. rotundicollis (Ménétriés). (*61) Thornton Ings (44/74), 29.v.87; RJM.

P. sanguinolentus (Gravenhorst). (*64) Newton Ings (44/42), 26.vii.89; MLD. Recorded from horse dung.

P. ventralis (Gravenhorst). (*63) Blackmoorfoot (44/01), 4.iv.81; MLD.

Gabrius bishopi Sharp. (*61) Aughton Ings (44/63), 19.viii.87; RJM & MLD. (*63) Elland Gravel Pits (44/12), 9.viii.86; MLD.

G. piliger Mulsant & Rey. (*63) Elland Gravel Pits (44/12), 27.viii.83; MLD.

Platydracus stercorarius (Olivier). (*65) Felham Ranges (45/00), 18.viii.90; MLD.

Staphylinus aeneocephalus Degeer. (65) Semerwater (34/98), 20.viii.88; PK. Recorded from deep moss and the first VC65 record since 1902.

S. compressus Marsham. (*63) Sprotbrough (44/50), 31.viii.88; RJM. In a compost heap. (64) Sherburn Willows (44/42), 12.vii.88; RJH, det. MLD. Only two other previous Yorkshire records.

S. ophthalmicus Scopoli. (63) Crow Wood (43/69), viii.90; JTB. Taken on the bank of a ditch. There is only a vague reference to its occurrence in Yorkshire in Stephens (1832).

Ontholestes murinus (Linnaeus). (61) Wheldrake Ings (44/74), 23.v.90; MLD. The second Yorkshire record, the first being for Spurn in 1952.

Heterothrops niger Kraatz. (*62) Throxenby Mere (54/08), 1986; MLD. (*63) West Wood (44/11), 20.vi.84; DM, det.MLD.

Quedius curtipennis Bernhauer. This species has often been confused in the past with *Q. fuliginosus* (Gravenhorst). The first authenticated records are: (61) Thornton Ings (44/74), 29.v.87; MLD. In *Glyceria* beds. (62) Caydale (44/68), 24.vi.84; RJM. (63) Kirkburton (44/11), 22.vi.80; MLD. (64) Malham (34/86), viii.55; W. O. Steel and Austwick Moss (34/76), v.87; WAE. (*65) Felham Ranges (45/00), 18.viii.90; MLD. Old records for this and the following species should therefore be treated with caution.

Q. fuliginosus (Gravenhorst). Authentic records for this species are: (61) Aughton Ings (44/63), 27.vii.88; MLD. (62) Kildale Moor (45/70), 10.vi.87; SG, det. RJM. In pitfall traps on heather moors. (63) Rossington Bridge (44/60), 11.vi.86; RJM. In the litter under a stand of *Carex paniculata*. (64) Bishopwood (44/53), 23.ix.81; RJM.

Q. fulvicollis (Stephens). (*63) New Mill (44/10), 10.i.85; DM, det. MLD. (63) Langsett (44/10), 23.viii.86; EJS. The first VC63 records of this infrequent species.

Q. nitipennis (Stephens). (*61) Rudston (54/16), 19.viii.89; MLD. (*64) Cawood (44/53), xii.89; KP, det. MLD. In pitfall traps.

Q. schatzmayri Gridelli. (*62) Levisham Moor (44/89), 3.ix.87 SG, det. RJM. In pitfall traps on *Calluna* heath.

Q. scitus (Gravenhorst). (*62) Duncombe Park (44/68), 26.v.87; RJM. The only other known Yorkshire record of this species is for Studley in 1871 (Waterhouse). Found on both occasions in the rotting heartwood of oak logs.

Q. semiobscurus (Marsham). (*64) Cawood (44/53), ix.90; KP, det. MLD. In pitfall traps.

Q. umbrinus Erichson. (*61) Saltmarshe Delph (44/72), 28.ii.82; PK.

Mycetoporus longulus Mannerheim. (61) Ellerton Ings (44/64), 29.v.87; RJM. The first VC61 record since that of G. B. Walsh. (*63) Blackmoorfoot (44/01), 7.v.85; MLD.

M. nigricollis Stephens. (*62) Egton Moor (45/70), 7.vii.87; MLD. Found in pitfall traps on heather moors. (*63) March Haigh (44/01), 6.v.85; DM, det. MLD.

M. punctus (Gravenhorst). (+61) Thornton Ellers (44/74), 19.viii.87; MLD. (*63) Drop Clough (44/01), 18.ix.87; MLD. In rabbit dung. There are no other known Yorkshire records.

M. rufescens (Stephens). (*63) Bretton Park (44/21), 15.iii.82; MLD.

M. splendidus (Gravenhorst). (*63) Sandall Beat (44/60), 6.v.83; RJM.

Bolitobius cingulatus (Mannerheim). (*61) Thornton Ings (44/74), 1987; MLD.

Tachinus corticinus Gravenhorst. (*63) Elland Gravel Pits (44/12), 1983; MLD.

T. proximus Kraatz. (*63) Barkisland (44/01), 1.viii.81; MLD.

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Photo: John Knight

ROE DEER

During the last 30 years the Roe Deer population throughout the country has increased considerably and there are few areas of cover in North Yorkshire that do not show signs of their presence. Roe normally feed at dusk and dawn but can frequently be seen in daylight, especially in undisturbed areas. Their presence in an area is however more often detected by the stripping of saplings, tracks and regular pathways through woodland and, in spring and summer, by their call, a bark remarkably similar to that of a dog.

Although a forest and woodland deer, they will often feed on arable farmland, especially adjacent to forests, and have recently been seen on open moorland in North Yorkshire when their presence resulted in an immediate and surprising reaction from several breeding birds. Lapwing, Curlew and Redshank all gave the same type of vigorous anti-predator response towards the deer that they use against foxes and other predators in or near their territories. Sheep on the moor are generally ignored by the birds unless their nests are in imminent danger of being trampled: this reaction against deer infers that their presence on the open

moor is a very recent occurrence and that they are considered by the birds to be potential enemies.

Rutting takes place in July and August and the fawns born the following April to June, with twins frequently occurring. The Roe Deer is the only artiodactyl to undergo a period of delayed implantation after fertilization. The photograph, taken in a mainly oak wood, shows a fawn only a few hours old.

THE G. B. WALSH COLLECTION OF *MELIGETHES* STEPHENS (COLEOPTERA: NITIDULIDAE), WITH NOTES ON PUBLISHED RECORDS

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INTRODUCTION

During the course of preparing the *Handbook to British Pollen Beetles*, to be published by the Royal Entomological Society of London, I have had cause to examine many collections in local museums, one such collection being that of G. B. Walsh. As this collection contains a good deal of material from Yorkshire localities, and some material which is cited in the literature it seems worthwhile to give a detailed account of its content here. As a result of misidentifications some records must be invalidated.

This paper is the result of a visit made to the Woodend Museum of Natural History, Scarborough in 1988, in order to examine pollen beetle genera (*Pria*, *Meligethes*, *Kateretes* & *Brachypterus*) held in their collections. Through the kindness of the curator, Mr C. I. Massey, I was able to borrow the material in order to examine it over a longer period and carry out the necessary genital dissections. The examination of the material was completed in 1989 and it has now been returned to the Museum.

The collection is comprised of 16 of our 36 British species (34 extant, see Kirk-Spriggs 1991) being: *Meligethes solidus* (Kugelann); *M. atratus* (Olivier); *M. flavimanus* Stephens; *M. fulvipes* Brisout; *M. aeneus* (Fabricius); *M. viridescens* (Fabricius); *M. difficilis* (Heer); *M. brunnicornis* Sturm; *M. tenebrosus* Förster; *M. bidens* Brisout; *M. ovatus* Sturm; *M. exilis* Sturm; *M. carinulatus* Förster; *M. nigrescens* Stephens; *M. planiusculus* (Heer); and *M. obscurus* Erichson. A detailed list of locality data for this material is given below.

In order to appreciate the value of this collection it was necessary to compile a list of the published records of G. B. Walsh, from entomological and local journals. In some cases these were records of specimens collected by Walsh, but not necessarily published under his name. As a result specimens cited in the literature are indicated.

MATERIAL EXAMINED

After re-examination based largely on genital characters the following list of the Walsh collection's contents is compiled.

Meligethes solidus (Kugelann)

8 Sharpenhoe [Bedford, VC 30], 27.vii.1924, P. H[arwood].

2 Woodeaton, Oxon. [Oxford, VC 23], 23.vi.1941.

1 Holmbury [Holmbury St Mary, Surrey, VC 17], viii.1896, E. A. B[edwell].

Meligethes atratus (Olivier)

5 males & 3 females, Lyndhurst [S. Hants., VC 11], v.1921, CET[ottenham].

1 male, Brockenhurst [S. Hants., VC 11], 26.v.1931, GBW.

Meligethes flavimanus Stephens

1 female, Raincliffe Woods [N.E. York, VC 62], v.1921, GBW. Specimen cited as syn. *M. lumbaris* (Walsh & Rimington 1956: 237).

- 1 male, Hayburn Wyke [N.E. York, VC 62], 6.vi.1922, GBW. Specimen cited as syn. *M. lumbaris* (Walsh & Rimington 1956: 237).
 1 male, Grantchester [Cambs., VC 29], 14.viii.1922, GBW.
 1 male, Quy [Cambs., VC 29], 10.viii.1922, GBW.
 1 male & 1 female, Wicken [Cambs., VC 29], 22.v.1923, GBW.
 1 female, Brampton [?Hunts., VC 31], 5.ix.1915, GBW.
 1 male & 1 female, Brockenhurst [S. Hants., VC 11], 21.v.1931, GBW.
 1 female, Sway [S. Hants., VC 11], 21.vi.1914, GBW.

Meligethes fulvipes Brisout

- 5 males & 3 females, St Bubwith [S.E. York, VC 61], 1.viii.1915, WJF[ordham].
 Specimens cited (Bayford 1914: 53; Fordham 1916: 261).

Meligethes aeneus (Fabricius)

- 1 Forge Valley [N.E. York, VC 62], 16.vii.1927, GBW.
 1 Troutsdale [N.E. York, VC 62], 25.vi.1927, GBW.
 1 Stanton Dale [N.E. York, VC 62], 22.vi.1927, GBW.
 1 Brockenhurst [S. Hants., VC 11], 26.v.1931, GBW.
 2 Selborne [N. Hants., VC 12], 10.viii.1929, GBW.

Meligethes viridescens (Fabricius)

- 2 Forge Valley [N.E. York, VC 62], 16.vii.1927, GBW.
 1 Stanton Dale [N.E. York, VC 62], 22.vi.1927, GBW. [Standing as *M. aeneus*.]
 1 Hayburn [N.E. York, VC 62], 31.v.1919, GBW.
 1 Hayburn Wyke [N.E. York, VC 62], 25.viii.1923, GBW.
 1 Hayburn Wyke [N.E. York, VC 62], 16.vii.1928, GBW.
 1 Buttercrambe [N.E. York, VC 62], 18.vi.1927, GBW.
 1 Buttercrambe [N.E. York, VC 62], 14.vi.1927, GBW.
 2 Scarboro'[ugh] Dist.[rect] [N.E. York, VC 62], 2.vii.1938, Geo. B. Walsh.
 1 Rhinefield, N.F. [New Forest, S. Hants., VC 11], 25.v.1931, GBW. [Standing as *M. aeneus*.]
 1 Handcross [E. Sussex, VC 14], viii.1894, 1120.

Meligethes difficilis (Heer)

- 2 males, East Boldon [Durham, VC 66], 5.viii.1918, GBW. [Standing as *M. viduatus*.]
 2 females, Cathill [Berks., VC 22], 23.ix.1917, J.C.
 1 female, Tubney, Berks. [Berks., VC 22], 27.iv.1914, J.C.

Meligethes brunnicornis Sturm

- 1 female, Winlaton Mill [Durham, VC 66], 15.vi.1907, GBW. [Standing as *M. viduatus*.]
 1 female, Winlaton Mill [Durham, VC 66], 13.ix.1916, GBW. [Standing as *M. viduatus*.]
 1 male & 1 female, Lamesley [Durham, VC 66], 19.vii.1913, GBW. [Standing as *M. fulvipes*.]
 1 male, Dovercourt [N. Essex, VC 19], vi.1911, EAN[ewbery].
 1 female, Higham's Park [S. Essex, VC 18], [No.] 1324, EAN[ewbery].
 1 male & 1 female, Hartlebury [Worcester, VC 37], 18.vi.1922. HD. [Standing as *M. difficilis*.]

Meligethes tenebrosus Förster (= *M. pedicularius* (Gyllenhal) auctt.)

- 1 male & 1 female, Filey [N.E. York, VC 62], vii.1924, GBW. [Standing as *M. brunnicornis*.] Specimens cited as *M. brunnicornis* (Walsh & Rimington 1956: 237).
 3 males & 5 females, Filey [N.E. York, VC 62], 3.vii.1928, GBW. [Standing as *M. viduatus*.] Specimens cited as *M. viduatus* (Walsh 1930: 198).
 6 The Lizard [W. Cornwall, VC 1], vi.1924, JHK[leys].

Meligethes incanus Sturm

- 3 females, Tubney, Berks. [Berks., VC 22], 2.viii.1909, JC. [Standing as *M. umbrosus*.]

Meligethes ovatus Sturm

- 3 males & 3 females, Pickering [N.E. York, VC 62], 4.ix.1922, GBW.

1 male, Scarborough [N.E. York, VC 62], 1922, GBW.

1 female, Ellerburn [N.E. York, VC 62], 1.viii.1934, GBW. Specimen cited (Fordham & Walsh 1936: 166).

1 male, Grantchester [Cambs., VC 29], 14.viii.1922, GBW.

Meligethes exilis Sturm

2 Port Erin, I.O.M. [Isle of Man, VC 71].

Meligethes carinulatus Förster (= *M. erythropus* (Marsham))

3 males & 1 female, Brockenhurst [S. Hants., VC 11], 26.v.1931, GBW. [2 standing as *M. picipes*].

2 males, Cathill [Berks., VC 22], 10.vi.1910, J.C.

1 female, Colgate, Sussex [W. Sussex, VC 13], 8129, EAN[ewbery].

Meligethes nigrescens Stephens

1 female, Pickering [N.E. York, VC 62], 4.ix.1922, GBW.

1 male, Raincliffe Woods [N.E. York, VC 62], 24.v.1925, GBW.

1 male & 1 female, Troutsdale [N.E. York, VC 62], 25.vi.1927, GBW.

1 male, Stainton Dale [N.E. York, VC 62], 22.vi.1927, GBW.

2 females, Barnard Castle [Durham, VC 66], viii.1916, GBW. [1 standing as *Brachypterus pubescens*; 1 standing as *M. serripes*].

1 female, Cumwhitton cd. [Cumberland, VC 70], 17.viii.1915, GBW.

1 male, Wicken [Cambs., VC 29], 24.v.1923, GBW.

Meligethes planiusculus (Heer)

1 male, Freckenham [W. Suffolk, VC 26], 24.v.1923, GBW.

2 males & 8 females, Freckenham [W. Suffolk, VC 26], 25.viii.1924, GBW.

Meligethes obscurus Erichson

4 males & 4 females, Rye [E. Sussex, VC 14], vii.1931 .

1 male & 1 female, Abinger [Surrey, VC 17], E. A. B[edwell].

2 females, Tubney, Berks. [Berks., VC 22], 3.vii.1909, JC. [Standing as *M. erythropus*].

1 female, Trefriw [Caernarvon, VC 49], viii. 1903, 12463, EAN[ewbery].

PUBLISHED RECORDS

Meligethes brevis

Horden, Co. Durham, 21 July, on *Helianthemum vulgare* (Walsh, 1915: 292–293). There is a cited specimen deposited in the Hope Entomological Collection, University Museum, Oxford, which I have seen and confirmed (Kirk-Spriggs 1991).

Forge Valley in some numbers on a limestone hill with *Helianthemum* and other flowers, R. Lawson; also taken by C. E. Stott 1936 (Walsh & Rimington 1956: 237). The former would apply to specimens described as *Meligethes pictus* (= *M. brevis* Sturm), by Rye (1871: 74–76), syntypes of which are deposited in many UK museums (National Museum of Wales; National Museum of Ireland, Bolton Museum; and University Museum of Zoology, Cambridge) (Kirk-Spriggs 1991).

Meligethes atratus

(As *M. rufipes*), Pickering, by beating and sweeping, G. B. Walsh (Mason & Pearsall 1929: 347). Wykeham, 6 June (Walsh 1945: 140).

Levisham, W. C. Hey; Scarborough, E. G. Bayford; Pickering, Hayburn Wyke, G. B. Walsh (Walsh & Rimington 1956: 237).

Meligethes flavimanus

(As *M. lumbaris*), Hilla Green, near Scarborough, G. B. Walsh (Fordham 1920: 241).

(As *M. lumbaris*), Littlebeck, M. L. Thompson; Hayburn Wyke, Raincliffe Wood, G. B. Walsh; Robin Hood's Bay, H. Britten (Walsh & Rimington 1956: 237).

Meligethes fulvipes

Bubwith, W. J. Fordham (Bayford 1914: 53).

Bubwith, abundant in August, W. J. Fordham; Redcar Marshes, G. B. Walsh (Fordham 1916: 261).

Forge Valley, fairly common by sweeping (Fordham & Walsh 1936: 166).

Raincliffe Wood, Forge Valley, Troutsdale, G. B. Walsh (Walsh & Rimington 1956: 237).

(As *M. rubripes*), Skipwith Common, 1926, G. B. Walsh; Raincliffe Wood, 1925, G. B. Walsh (Thompson 1926: 271).

Meligethes aeneus

Arncliffe Wood, G. B. Walsh (Pearsall & Mason 1925: 187).

Hovingham (Walsh 1935: 256).

Hutton Le Hole, 5 June 1937 (Walsh 1937: 202).

Pickering (Walsh 1938: 239).

Wykeham, 6 June (Walsh 1945: 140).

Very common in the Scarborough area (Walsh & Rimington 1956: 237).

Meligethes viridescens

Hovingham (Walsh 1935: 256).

Hutton Le Hole, 5 June 1937 (Walsh 1937: 202).

Wykeham, 6 June (Walsh 1945: 140).

Common in the Scarborough area (Walsh & Rimington, 1956: 237).

Meligethes brunnicornis

Rare, Filey, E. C. Horrell (Walsh & Rimington 1956: 237).

Meligethes pedicularius (Gyllenhal) nec. auctt. (= *M. viduatus* (Heer))

(As syn. *M. viduatus*) Primrose Valley, near Filey, common on flowers of *Geranium sanguineum* G. B. Walsh (Walsh 1930: 198).

(As syn. *M. viduatus*) Primrose Valley, on *Geranium sanguineum*, W. J. Fordham, G. B. Walsh (Walsh & Rimington 1956: 237).

(As *M. viduatus* [sic]), Filey, Scarborough District, G. B. Walsh (Thompson 1930: 85).

Meligethes obscurus

Rare, Scarborough, J. H. Bailey; Sleight, H. Britten (Walsh & Rimington 1956: 237).

Meligethes nigrescens

(As *M. picipes*), Hovingham, fairly common in marshy places (Walsh 1935: 256).

(As *M. picipes*), Hutton Le Hole, 5 June 1937 (Walsh 1937: 202).

(As *M. picipes*), common in the Scarborough area (Walsh & Rimington 1956: 237).

Meligethes ovatus

On flowers at Ellerburn (rare, only from VCs 61, 62) (Fordham & Walsh 1936: 166).

Primrose Valley, on *Geranium sanguineum*, W. J. Fordham, G. B. Walsh (Walsh & Rimington 1956: 237).

CONCLUSIONS

The G. B. Walsh collection of *Meligethes* is shown to comprise 139 specimens of 16 species. Forty-six specimens are from Yorkshire localities of which 21 specimens are shown to be cited in the literature (2 *M. flavimanus*; 8 *M. fulvipes*; 10 *M. tenebrosus*; 1 *M. ovatus*). Of the total 139 specimens contained within the collection 29 were misidentified.

Although many records are attributed to G.B. Walsh it appears that not all of the records are based on specimens contained within his collection at Woodend Museum of Natural History. It is possible that Walsh changed his mind about some of his identifications after the publication of the records. Such might explain the specimens of *Meligethes aeneus* from Forge Valley and Troutdale, which are I suspect the specimens on which the *M. fulvipes* records for these localities were based (Walsh & Rimington 1956: 237).

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BOOK REVIEWS

Behavioural Ecology by J. R. Krebs and N. B. Davies. Pp 482, with 79 figures. Blackwell Scientific Publications, 1991. £19.95.

This is the third edition of the standard textbook in the field, and has been so completely rewritten that a new title might have been appropriate — perhaps 'Advances in Behavioural Ecology'. This would also prepare the reader for the substantial conceptual difficulties in this complex field.

The cover claims the book continues the 'tradition of clarity and accessibility' of the previous editions. To certain readerships this may be so, but the newcomer to the field would be strongly advised to begin with the 'Introduction to Behavioural Ecology' by the same authors. The book is not for the layperson, however intelligent, and even many students specialising in these areas will find such complex material difficult. Clarity is not improved by a flurry of typological errors early in the book, reducing to a dribble in later chapters.

Without doubt, this book serves a useful purpose in drawing together very recent and exciting literature in this rapidly expanding area, and presenting some novel ideas. The full understanding of any one chapter is dependent upon knowledge from several other chapters, although few will read it from cover to cover. A high level of intellectual rigour is clear throughout. The editors grasp the nettle and include a welcome chapter on human behavioural ecology, although this is rather limited in scope and does not address many interesting areas such as sexual ornamentation, or aggression.

This book, then, is for a specialist and able readership, interested in the ways theory, modelling and experimental work have explained many puzzles in animal foraging, signalling, breeding and socialising. It reveals how fast we are learning, yet how far we have still to go, in our understanding of behavioural processes relevant to ecology.

The Biology of the Naked Mole Rat edited by P. W. Sherman, J. U. M. Jarvis and R. D. Alexander. Pp. xvi + 518, one colour plate and numerous line drawings, maps and monochrome photographs. Princeton University Press. 1991. \$65.00 cloth, \$24.95 paperback

The Naked Mole-Rat is unique among mammals. Firstly, it is, as its name suggests almost devoid of hair. Secondly, its underground colonies display a social structure more like that of a social insect than a mammal. Castes exist in which, for example, some animals are workers, others inactive supporters of the brood chamber and only a single female is reproductively active. Like her insect counterpart she produces large numbers of progeny. This vegetarian rodent is only found in arid parts of Ethiopia, Somalia and Kenya. In 1967 Jennifer Jarvis first started working on the ecology and sociobiology of this species in Kenya. Her research has continued since that time and the study expanded with the establishment of colonies in Michigan, Cornell, London and Cape Town where Professor Jarvis is now based. The book is a comprehensive review of work on this species from all these research centres. Following three introductory chapters, topics covered include ecology, population structure, vocal and non-vocal behaviour, social organisation, reproduction, growth and genetics. This volume has the advantage of being up-to-date and comprehensive. It is a fascinating account of a very unusual animal written by individuals who have actually worked on it. The book will be of value to mammalogists, behaviourists, sociobiologists and any naturalist interested in a very unusual animal.

MJD

Fuller's View from the Attic by John Fuller. Pp ii + 134 with 12 line drawings. R. & W. Publications, Newmarket. £7.95.

For many years John Fuller has worked in one of the top floor rooms (hence the book's title) of the Cambridge University Veterinary School. From here he encountered many species of animals as well as witnessing veterinary practice, research, teaching and illustration. The book is largely concerned with his artistic record of these activities. In addition, Fuller illustrates events in his life, Cambridge and various animal/veterinary activities in rural situations. Some illustrations are humorous, some representational and others with obvious applications to research and teaching. Fuller is a very good artist with a keen eye for detail. Furthermore, the breadth of his talent is exemplified by the diversity of his subject material. My favoured choice is of the faces and heads of animals; these contain great vitality and representational accuracy. My only criticism of the book is the length and content of the text which emphasises much of the author's early life and co-ordinates indifferently with the illustrations.

MJD

Identification chart of British and Irish dragonflies. 1990. Harley Books. 70 × 100 cm. £4.99.

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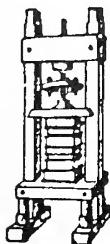
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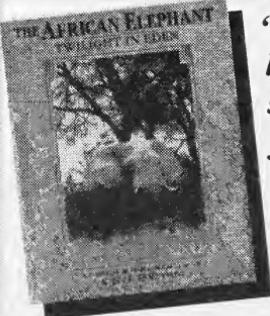
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A STUDY OF THE MACRO-INVERTEBRATE FAUNA OF SPICEY GILL, A STREAM RISING ON ILKLEY MOOR

M. ANDREWS

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Much work has been done on the fauna of rivers and streams. In Yorkshire, Percival and Whitehead led the way, through their studies of the invertebrates of the rivers Wharfe and Derwent (1929, 1930, 1935). Several workers explored the fauna of Welsh mountain streams. A landmark was the publication of a synthesis by Hynes (1970) of works on life in running water world-wide. Continuing research resulted in the production of the keys used here.

This study aims at identifying the macro-invertebrates of a stream, Spicey Gill, Ilkley, to assess the sizes of the populations of the important species throughout the year, attempt to explain their variation spatially and temporally, and also if possible throw further light on the life histories of some of the species present.

Spicey Gill (Figure 1) is formed by the confluence of a number of tributaries, some draining peat, others draining the underlying Millstone Grit. It is a stony stream, little more than 1 m in width and up to 0.5 m deep, flowing down the heather moor in a steep-sided gully. The vegetation of the moor was recently described by Cotton and Hale (1989). On leaving the moor, the stream continues to flow in a deep gully between gardens on the steep hillside, beneath overhanging deciduous trees. The stepped profile of the Millstone Grit underlying the whole area has caused the formation in the stream of a number of quiet pools and chutes, and two waterfalls. The stream finally flows across the valley bottom to join the River Wharfe between Ilkley's two bridges (GR 44/115.482).

Station 1 (alt. 275 m, GR 44/108.464) is a little below the confluence of the tributaries forming the stream. At Station 2 (alt. 207 m, GR 44/110.468), Spicey Gill crosses a marine band, then flows steeply down to the outskirts of Ilkley. Station 3 (alt. 130 m, GR 44/113.474) is at the bottom of a garden in a road leading to Ilkley town centre. Station 4 (alt. 100 m, GR 44/113.477) is just above the point where the stream disappears under the main road to Skipton.

As far as possible, each station was visited once each month to collect invertebrates and to test the pH of the water. Since the use of quantitative methods in Spicey Gill is almost impossible, a semi-quantitative method was adopted. Invertebrates were collected from 30 stones. Two tins of 130 ml capacity were filled with sand or gravel and an identical third tin filled with moss, lightly pressed down with fingers. Debris was collected into a polythene bag, size 180 mm by 230 mm, which was half filled, leaving room for tying. Collecting was usually completed from about 10 m length of stream, but after a spate, it was sometimes necessary to go as far as 100 m to collect gravel and debris. Invertebrates were sorted from the samples, and identified using keys by Eddington and Hildrew (1981), Elliott, Humpesch and Macan (1988), Hynes (1977), Macan (1959) and Savage (1989). Case-bearing caddis larvae (Trichoptera), except for *Agapetus fuscipes*, were bred out and the adults identified using the key by Macan and Worthington (1973). For *A. fuscipes* a new key by Wallace *et al.* (1990) was used. pH was determined using BDH universal indicator. This simple method gives only approximate readings, but is adequate for the purpose of showing the effect of spates. Invertebrates not required for further study were returned to the stream. This procedure was continued for two and a half years.

At Station 1, the pH fluctuates. During a period of dry weather the water is nearly neutral (c.6.5), but generally within two weeks of heavy rain or snow it becomes acidic (4.0) because of the extra water entering the stream from the peat. At the other three stations, with only occasional exceptions, the water remains near neutral (7.0). This most likely results from the presence in the stream bed of particles of calcareous materials which originate either in the marine band or in the glacial drift on which much of Ilkley is built. It is possible also that runoff from gardens affects the pH of the water at Stations 3 and 4. Figure 2 presents a summary

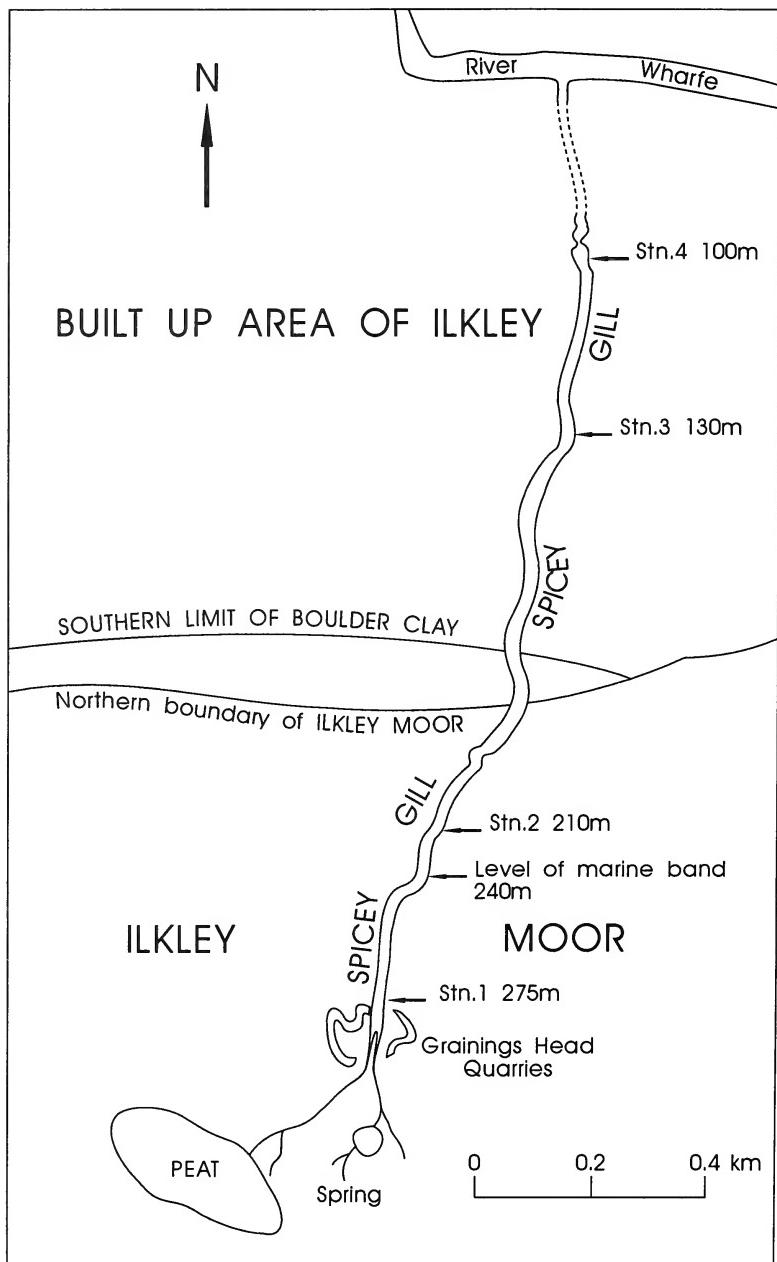


FIGURE 1

TABLE 1

Composition of the fauna at the four stations. The figures given are the most collected at any one time. Some species found only once are omitted

	STN 1	STN 2	STN 3	STN 4
<i>Polycelis felina</i> (Dalyell)	1	0	2	4
Rhabdocoelida	0	0	1	1
<i>Potamopyrgus antipodarum</i> (Gray) = <i>P. jenkinsi</i>	0	0	2	1000+
<i>Ancylus fluviatilis</i> Müller	0	0	2	250+
<i>Glossiphonia complanata</i> (L.)	0	0	0	2
Annelida	0	4	2	5
<i>Gammarus pulex</i> Koch	0	0	2	250+
Hydracarina	0	0	2	3
<i>Velia caprai</i> Tananini	100	60	100	100
<i>Protonemura praecox</i> (Morton)	40	25	44	9
<i>Amphinemura sulcicollis</i> (Stephens)	42	54	19	5
<i>Nemoura cambrica</i> (Stephens)	7	4	41	1
<i>N. cinerea</i> (Retzius)	16	2	3	0
<i>Leuctra hippopus</i> (Kempny)	145	41	5	0
Brachyptera	0	0	1	4
<i>Isoperla grammatica</i> (Poda)	0	0	3	1
<i>Baetis rhodani</i> (Pictet)	7	30	20	11
<i>Rhithrogena semicolorata</i> (Curtis)	0	0	0	4
<i>Ecdyonurus dispar</i> (Curtis)	0	0	1	1
<i>Rhyacophila dorsalis</i> (Curtis)	1	7	25	4
<i>Plectrocnemia conspersa</i> (Curtis)	2	4	4	7
<i>P. geniculata</i> McLachlan	1	1	1	0
<i>Hydropsyche pellucidula</i> (Curtis)	0	0	4	4
<i>Agapetus fuscipes</i> Curtis	0	0	1	250+
Limnephilidae	10	10	12	100+
<i>Simulium</i>	120	220	7	1000+
Chironomidae	11	120	1000+	1000+
<i>Dixa</i>	0	6	51	14
<i>Pericoma</i>	12	3	4	1
<i>Dicranota</i>	1	5	2	0
Tipulidae	1	2	5	6
Other dipteran larvae	1	1	2	0

of rainfall and pH at Station 1 in 1989. In spring and autumn at Stations 1 and 2, outbursts of filamentous green algae, desmids and diatoms occur, and throughout the year there is much particulate detritus. At Stations 3 and 4 in autumn and winter, vast numbers of leaves accumulate in the water, forming a substrate for the growth of fungi and bacteria, thus providing abundant food for herbivorous invertebrates.

Table 1 lists the invertebrates found in the stream. The Plecoptera (stoneflies) form an important constituent of its fauna. Stoneflies are univoltine (one generation per year). They fly

early in the year. Egg hatching and growth of larvae spread over several months, so that in summer the larvae are microscopic in size, are hiding in gravel or moss, and are rarely found. Figure 3 shows the numbers of stonefly larvae found at each station for each month in 1989. The principal species found were *Amphinemura sulcicollis*, *Protoneuria praecox*, *Nemoura*

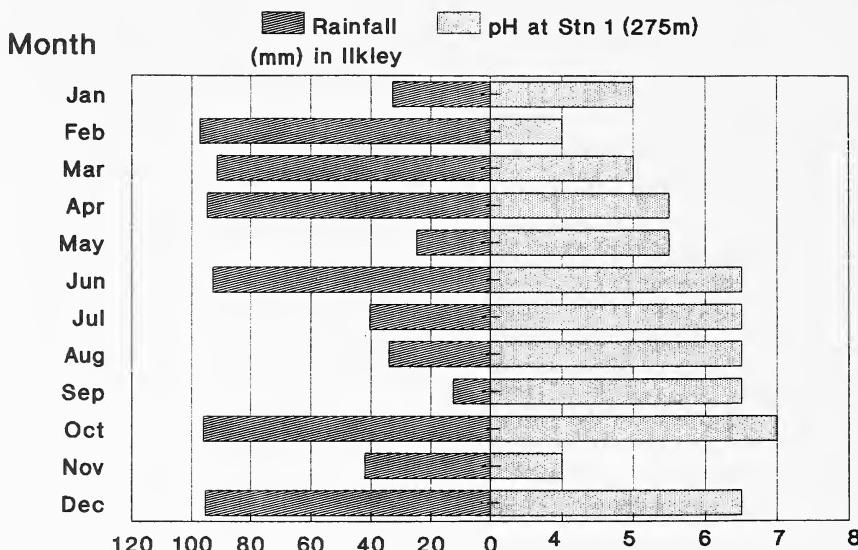


FIGURE 2
Monthly Rainfall and pH at Station 1.

cambrica, and *Leuctra hippopus*. Figure 4 indicates variations in population sizes of these four species at all four stations together in 1989. A similarity in the pattern of population sizes throughout the year is clearly demonstrated. Diagrams 4a and 4c show a March increase in numbers of larvae of *A. sulcicollis* and *N. cambrica*. Such a spring increase has been explained as resulting from a renewed hatching of eggs after the very adverse conditions of winter spate (Hynes 1970).

Of the mayflies (Ephemeroptera) only *Baetis rhodani* is common, and because of its long flight period, the larvae are found from February to November. *B. rhodani* is a bivoltine species (two generations per year) found at all four stations, though in numbers decreasing with increasing altitude. Spring flying adults emerge in April and May. Their eggs hatch in June and July, and the second emergence occurs in August. The eggs of the autumn adults give rise to overwintering larvae, the majority of which are washed down in winter spates. At Stations 3 and 4, a few larvae of *Rhithrogena semicolorata*, *Heptagenia lateralis* and *Ecdyonurus dispar* also occurred. These are univoltine and overwinter as larvae. Their well-grown larvae were found in spring and early summer.

Figure 5 summarises the results of collections of Trichopteran (caddis fly) larvae at all four stations in 1989. At Station 4 only, thousands of larvae of *Agapetus fuscipes* occurred. Other case-bearing caddis larvae decreased in numbers with increasing altitude. They are represented by *Drusus annulatus*, *Micropterna sequax*, *Potamophylax cingulatus*, *P. latipennis* and *Odontocerum albicorne*. Caseless caddis larvae were most abundant at Station 3, where *Rhyacophila dorsalis*, *Plectrocnemia conspersa*, *P. geniculata*, and *Hydropsyche*

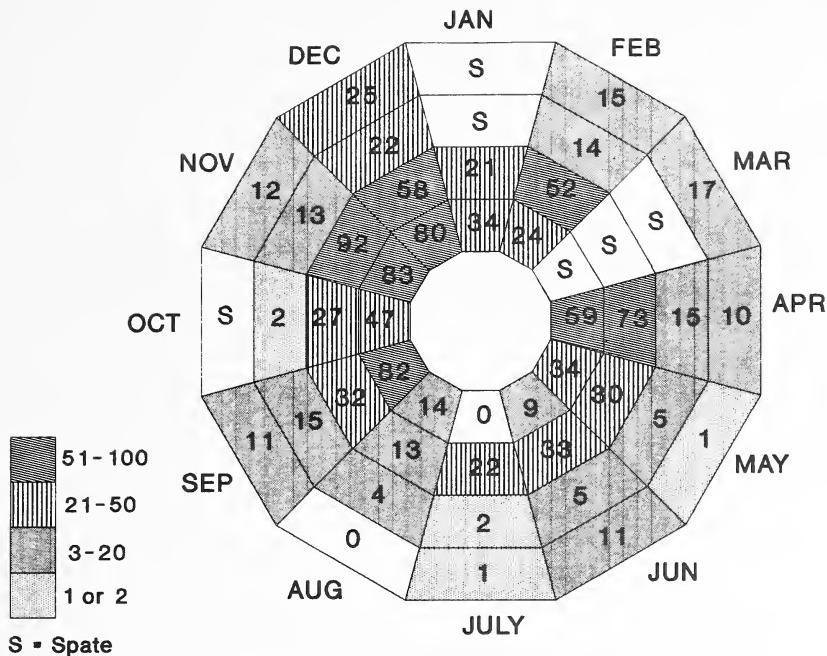


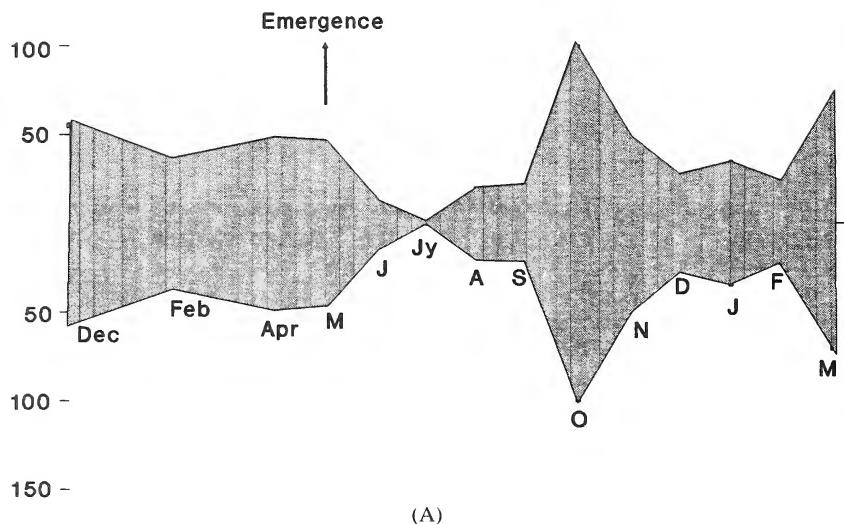
FIGURE 3

Numbers of Stonefly larvae (Plecoptera) collected each month in 1989.
The innermost ring gives the numbers for Station 1, the outermost for Station 4.

pellucidula occur. The paucity of caddis larvae at Station 1 is most likely related to the frequent spates and episodes of acidity, which also cause a washdown of mayfly and stonefly larvae even if they are acid tolerant. A sudden drop in numbers of stoneflies and mayflies may indicate emergence of adults. A comparable fall in numbers of caddis larvae does not occur because there are nine species which emerge over a period of eight months.

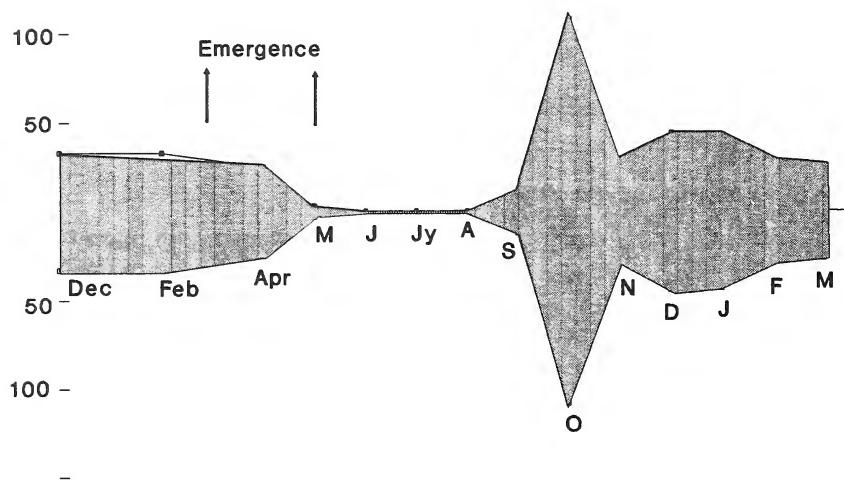
A few small members of Veliidae (Hemiptera Heteroptera) were noticed on the surface of quiet pools all the way down the stream in June and July. These may have been early instars of *Velia*, as the adults of *Velia caprai* were collected in August and September, at which time as many as 100 were seen together in one pool. Larvae and adults of several species of beetle (Coleoptera) were taken, the most frequent being dytiscids and halophilids. The only conclusion that could be drawn from these collections is that beetles occur chiefly in moss and debris. No preference for shade was noted. At Station 4 the stream flows more slowly, and widens to enclose two small islands. Some of the invertebrates found here do not occur in the upper reaches. Figure 6 relates to invertebrates that occur only at Station 4, where *Potamopyrgus antipodarum* (=*P. jenkinsi*, snails) *Ancylus fluviatilis* (fresh water limpets), *Gammarus pulex* (Amphipoda, shrimps) and *Agapetus fuscipes* are found. In summer 1989 during a period of rapid reproduction, vast numbers of *P. antipodarum*, *A. fluviatilis* and *A. fuscipes* of various sizes were found. There were so many that their numbers were estimated from counts on ten stones, and numbers rounded to the nearest 50, 100 or 1,000. In 1990 only *P. antipodarum* occurred in comparable numbers. Since *A. fluviatilis* and *A. fuscipes* feed exclusively on algae on the stones in the stream, it seems probable that the algae did not recover sufficiently in

Amphinemura sulcicollis

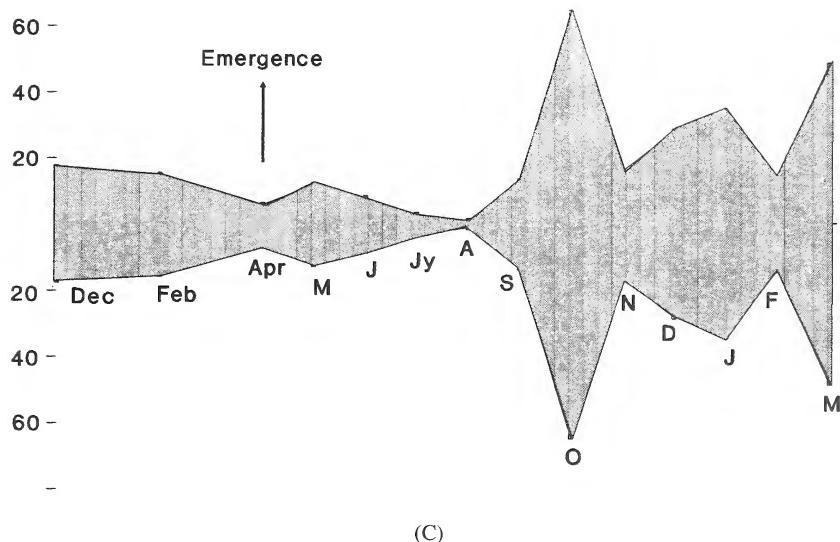


(A)

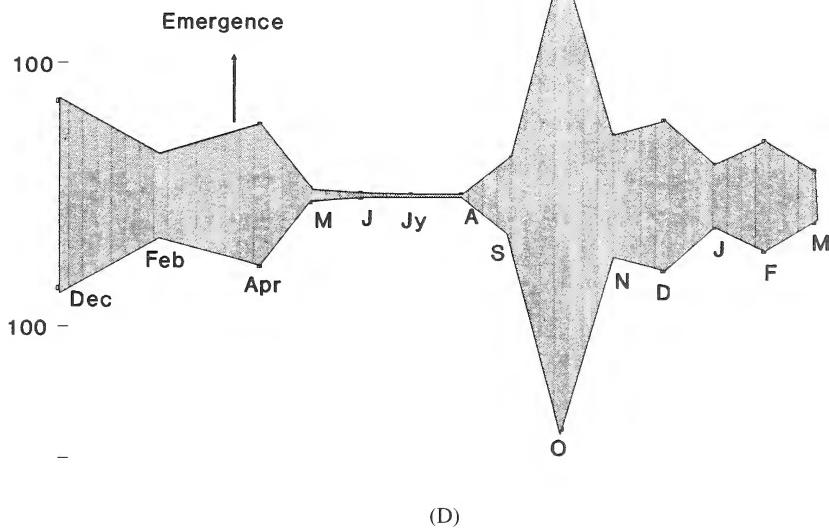
Protonemura praecox



(B)

Nemoura cambrica

(C)

Leuctra hippopus

(D)

FIGURE 4

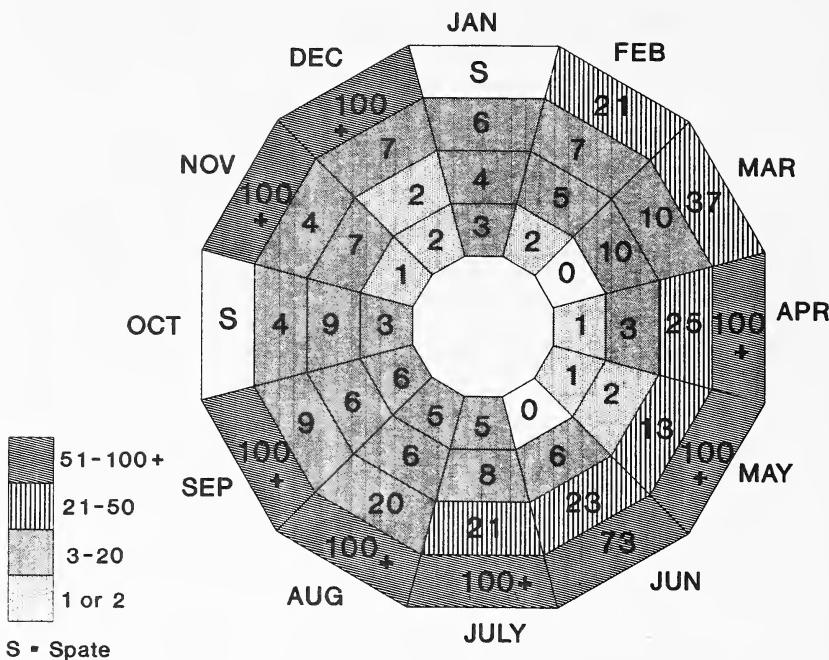


FIGURE 5

Numbers of caddisfly larvae (Trichoptera) collected each month in 1989.
The innermost ring gives numbers for Station 1, the outermost for Station 4.

1990 to support large populations of these species. *P. antipodarum* consumes algae, dead leaves and moss, and is not affected in the same way.

Hynes (1970) showed that annual variation in population sizes of fresh water invertebrates is not uncommon, and Hunter (1961), in a 9-year study of a stream in Scotland, showed that the annual variation of assessed productivity of *A. fluviatilis* can be over 7-fold.

A feature of the fauna of the stream is the predominance of herbivores, which include most of the stonefly larvae, the mayfly larvae, the case-bearing caddis larvae, the snails and limpets. The carnivores include the stoneflies *Isoperla grammatica*, the caseless caddis larva, *R. dorsalis* and *Plectrocnemia* spp. which feed on other small larvae. *Velia* feeds on spiders (Arachnida), emerging midges (Chironomidae), stoneflies and mayflies (Savage 1989). Several larval and adult water beetles (Coleoptera) are carnivorous, as also are the leeches *Glossiphonia complanata* and *G. heteroclitia* which feed on *P. antipodarum*. Some of the dipteran larvae are carnivorous. Many are eaten by other carnivores. Apart from the dipteran larvae, only small numbers of these carnivores are found. Because of their vast numbers, dipteran larvae – *Simulium* (blackfly) and chironomids (midges) – are important though inconspicuous constituents of the fauna of the stream.

The ecosystem of the stream is simple. There are relatively few species of invertebrates and no fish. Occasionally water birds are seen, e.g. dipper (*Cinclus cinclus*), and grey wagtail (*Motacilla cinerea*). The macro-invertebrate fauna is comparatively varied, and on the basis of the presence throughout the part of the stream studied of more than one species of stonefly,

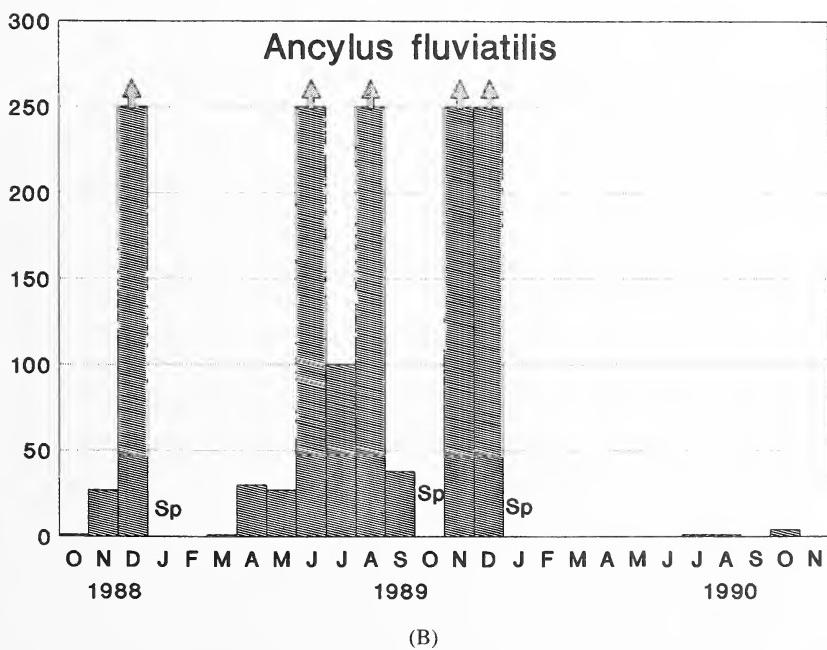
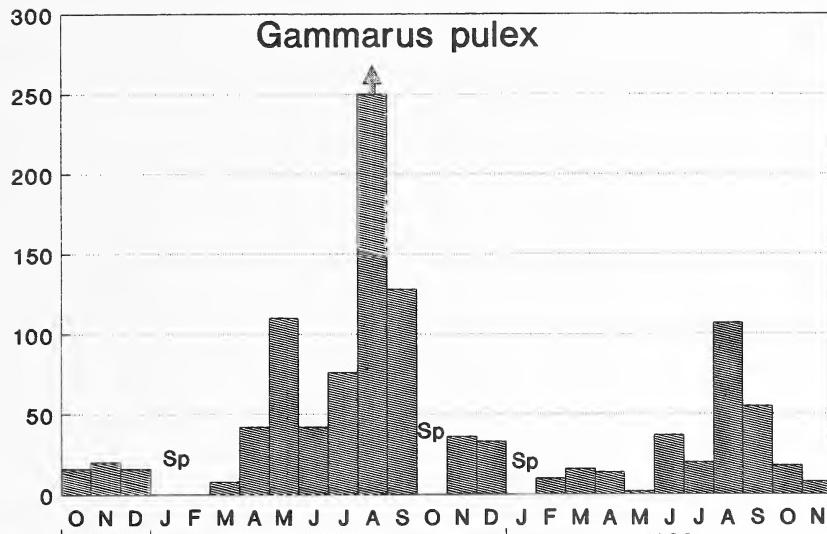
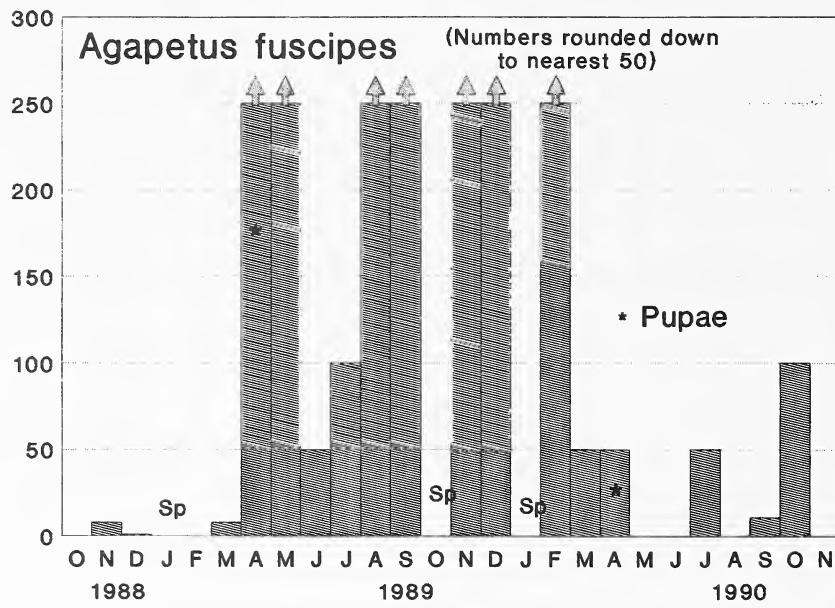


FIGURE 6



(C)

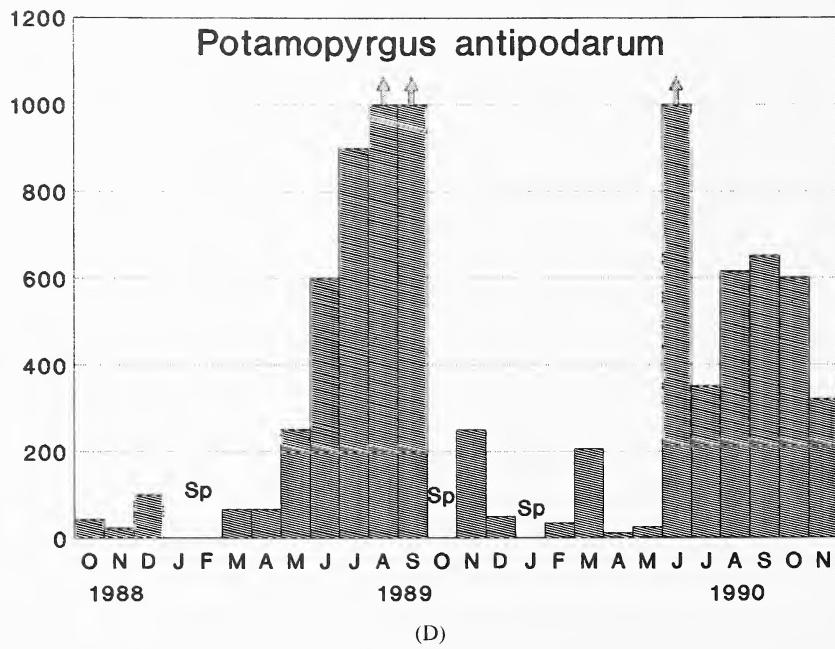


FIGURE 6 (continued)

and of at least sixteen other species, the stream is judged to be clean and free from organic pollution (Hellawell 1978).

Calcareous material is frequently added to naturally acid waters in order to neutralise the acidity. The purpose of this is either to make the water safe to supply to establishments which have lead water pipes, or to increase the invertebrate fauna and so improve fish stocks. In Spicey Gill, it seems to be the granules of calcareous material in the gravel that neutralise the water, and this would suggest that the amount required to be added for this purpose is small.

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BOOK REVIEW

The Moths and Butterflies of Great Britain and Ireland. Volume 7, Part 2. Lasiocampidae – Thyatiridae, with a Life History Chart of the British Lepidoptera. Edited by A. Maitland Emmet and John Heath. Pp. 400, 8 colour plates. Harley Books, Colchester, Essex. 1991. £49.50.

This latest publication in the definitive series eventually intending to cover the whole of the lepidoptera of Great Britain and Ireland is the concluding part of the original volume 7, of which the butterflies were treated separately in volume 7, part 1 (reviewed in this journal in 1990, *Naturalist* 115: 31–2). This has left the present part with a much reduced taxonomic content and only thirty species are treated here, the Lasiocampidae, Saturniidae, Drepanidae and Thyatiridae by B. Goater and the Endromidae by M. R. Young. These occupy 47 pages of text and are illustrated on four colour plates of paintings by Richard Lewington.

Thus the introductory material is more extensive than has hitherto been the case, beginning with a chapter on the Classification of the Lepidoptera by M. J. Scoble. This outlines the history and development of the classification of the higher taxonomic groupings in the lepidoptera and goes on to discuss the characteristics and variability of the various superfamilies at some length. The chapter is well constructed and thought provoking but may make quite heavy reading for the field lepidopterist. Chapter two 'Resting Posture in the Lepidoptera' is of much more general interest; it is jointly authored by M. W. F. Tweedie and A. M. Emmet. Seven pages of text outline historical aspects and provide an introduction to four colour plates (lettered A–D) which depict 64 photographs of 61 species of lepidoptera and one caddis-fly. The subjects are on the whole well chosen to illustrate a variety of resting postures of the adult insects but there is some duplication of similar resting postures within the same family (e.g. plate A 10 & 11, 13 & 14, plate C 4 & 5) while there are no examples of species in such extensive families as the Tineidae, Gracillariidae, Coleophoridae, Elachistidae or Gelechiidae despite the characteristic protracted antennae of the family Coleophoridae being mentioned in the text.

The major part of this book (240 pages) is taken up with a chart showing the life history and habits of the British lepidoptera, compiled by A. M. Emmet. It covers the whole of the British species including such recently added ones as *Phyllonorycter platani* Staud. and *P. leucographella* (Zell.). These are arranged in double page spreads and give a month by month indication of the life history of each species together with symbols indicating the status, distribution (generally by defined regions), habitats, flight times and foodplants. The nature of these tables involves the use of abbreviations and symbols which are duplicated on a plasticised card to permit easy interpretation without the need to continually turn back to the beginning of the chapter. The amount of information contained in the chart is considerable and is a tribute to Col. Emmet's organisational ability. It also provides the most up to date and (so far as the reviewer can tell) error-free list of the entire British lepidoptera. Separate indices are provided for the life history chart.

The standard of production is equal to that of previous volumes in this series. The cost of the present publication may seem high in view of the small number of moths treated; however, the life history chart adds a great deal to its usefulness, especially in providing information on species in those families not yet covered by this on-going series. A must for the serious lepidopterist; those who baulk at the price must wait for the paperback edition.

HEB

A NOTE ON THE VEGETATION OF SOME ENGLISH CRONS

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The flora of three recently discovered 'crons' is described from the UK and compared with the crons of Belgium. The cryptogamic vegetation of the two regions is almost identical. Among higher plants, the grass *Sesleria albicans* was dominant at all sites. Differences in the vegetation between the two areas is explained by their differing latitude, surrounding microclimate and grazing.

INTRODUCTION

The term *cron* refers to a specific type of travertine deposit found in the Belgian district of Lorraine (van Oye & Hubert, 1937). The deposits form on steep valley sides below highly calcareous springs and consist of irregular, protuberant masses of water-saturated travertine. Travertine is a deposit of calcium carbonate forming around calcium-rich springs and streams. The deposits often form around the bases of plants, forming a brittle, but highly porous crust.

Narrow, braided rivulets run over the steeper cron slopes into permanently wet hollows. Crongs are readily distinguished from travertine cascades where the water normally follows a single, locally eroded course, without associated wetland hollows. Because of their irregular topography, cron vegetation is diverse and of considerable interest, ranging from that of a calcareous mire to a well-drained and porous limestone.

The crongs of Lorraine are well known (van Oye, 1937; Symoens *et al.*, 1951; Iserentant, 1988; Pentecost, 1991) and one, the Cron de Montauban, is now a nature reserve. Both cryptogams and phanerogams are well represented, and the rare desmid *Oocardium stratum* is characteristic of many sites. Crongs are not unique to Belgium and occur throughout the world, but they have not been documented in Britain.

Recently, a fine example with abundant *Oocardium* was found near Cam Gill in the Yorkshire Dales (Pentecost, 1991). The vegetation of this cron and of two others recently discovered is briefly described in this article.

SITE DESCRIPTIONS

All three sites occur in the Yorkshire Dales on valley sides composed of the Great Scar Limestone. Site locations, together with associated relict (i.e. inactive) crongs are shown in Figure 1. Some physical characteristics are shown in Table 1. The described sites are at Cam Gill (GR 34/955754), Clapham Beck (43/754712) and Kettlewell (34/974733). The travertine deposits are all formed a short distance below small calcareous springs issuing from the limestone. These springs are permanent, though discharge varies considerably, and is generally higher during the winter. The deposits are small when compared with those of Belgium. Cam Gill is the largest of the three, and in its morphometry and size most closely resembles those of Lorraine. All three crongs occur on open and exposed valley sides where grassland predominates and there was evidence of grazing by sheep and rabbits.

Clear evidence of travertine deposition, particularly around moss polsters and algal mats, was found. The crongs show protuberant relief owing to the build-up of travertine downslope to a height of 1–3 m above the adjacent valley sides. Their uneven profiles result from the irregular growth of the travertine, but soil creep is also responsible for some of the terracing at Cam Gill.

Some chemical characteristics for the sites are given in Table 1. The water was sampled mid-way down the crongs, where pH is usually close to 8.0. At the springs, pH is normally lower because outgassing of carbon dioxide does not usually become significant until the groundwater contacts outside air. The chemical characteristics of the three sites are similar and the calcite saturation indices, being considerably greater than unity, show that calcium

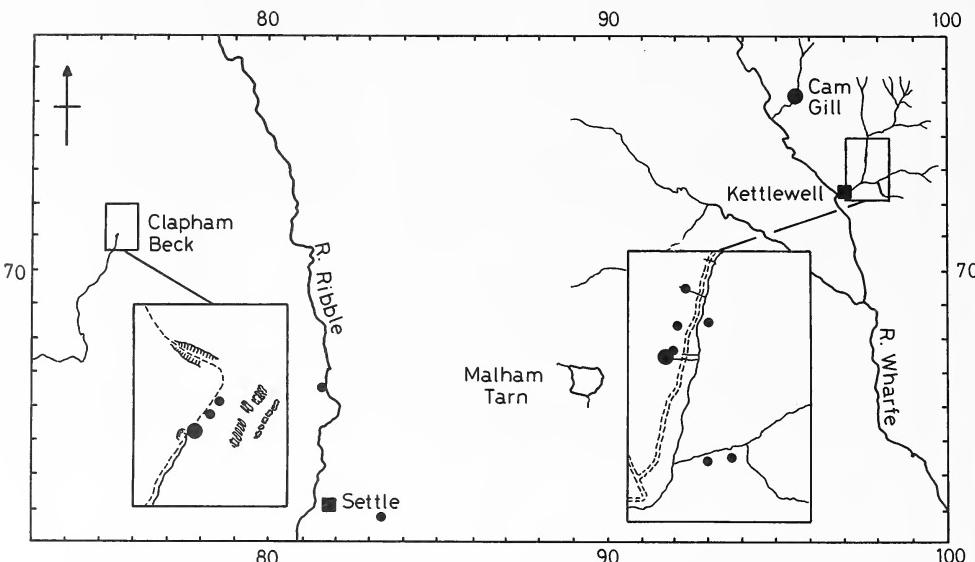


FIGURE 1

Locations of known active (●) and relict (○) crans in the southern Yorkshire Dales.
Bar ticks are 1 km apart.

carbonate deposition is thermodynamically favourable.

The vegetation is diverse (Fig. 2, Table 2) and reflects the moisture regimes of these sites. Five 'zones' can be distinguished, though sharp boundaries are rarely maintained. 1) truly aquatic vegetation growing in the rivulets, colonised by algae and bryophytes; 2) boggy hollows containing calcareous mud; 3) bryophyte hummocks permanently saturated by capillarity; 4) saturated ground, often with thin soil developed over the travertine; 5) well-drained travertine hummocks with soils up to 10 cm thick. This last zone develops in response to travertine formation which is continuously changing the course of streams.

Where water flow is more or less continuous, a rich algal and cyanobacterial flora develops. Characteristic species are *Schizothrix calcicola* agg., *Homoeothrix crustacea*, *Achnanthes minutissima* and *Oocardium stratum*. The latter is only known from Cam Gill, where large areas are covered with a bright green crystalline crust. Considering their small size, the microbial flora is very rich. Only a selection of species is provided in Table 2. Important aquatic bryophytes are *Bryum pseudotriquetrum*, *Cratoneuron commutatum*, *C. flicinum* and *Pellia fabroniana*.

Boggy hollows provide a muddy environment unsuitable for algae except *Chara vulgaris*. The areas are covered in *Carex* species, particularly *C. lepidocarpa* and *C. flacca*. Species of *Eleocharis*, *Eriophorum*, *Juncus* and *Hypocoeris* also occur.

Moss polsters are a characteristic feature of all crans. Large cushions up to 50 cm high of *Eucladium verticillatum*, *Gymnostomum recurvirostrum* and particularly *Cratoneuron commutatum* develop as travertine encrusts the lower stems, providing a stable base for further growth. Old, dense blocks of travertine, when broken open, usually reveal moulds of these bryophyte cushions.

Sloping ground, intermittently saturated with seepage water, occurs adjacent to the watercourses and supports interesting plant communities. Flowering plants include *Cirsium palustre*, *Filipendula ulmaria*, *Montia fontana*, *Parnassia palustris*, *Pinguicula vulgaris* and

Selaginella selaginoides. Carices are also common. On slightly drier ground, *Primula farinosa* and *Crepis paludosa* occurred, and grasses became more evident. *Sesleria albicans* was the most abundant plant on all three crons and sometimes grew on wet ground with *Molinia caerulea*. Tussocks of *Molinia* also provided centres for travertine accumulation at Cam Gill (Fig. 2). Other grasses were found on the driest parts of old travertine hummocks e.g. *Deschampsia flexuosa* and *Festuca rubra* along with the moss *Ctenidium molluscum*. Old travertine hollows supported *Preissia quadrata*. On the basis of plant distribution, the wettest and driest crons were Cam Gill and Clapham Beck respectively. The richest site was Cam Gill, where 38 species were recorded.

DISCUSSION

Though smaller than their Belgian counterparts, the Dales crons possess a rich flora. Cam Gill cron, the richest, is unique in Britain with its fine algal-bryophyte associations including *Oocardium stratum*. The bryophyte associations of the Belgian sites have been described by de Sloover & Goossens (1984) and these authors distinguished four communities: a *Eucladietum verticillatum* developing on steep slopes, a non-incrusting *Gymnostometum recurvirostri*, and a *Cratoneuretum commutatum* succeeding a cyanobacterium association, the *Scytonematatum myochrouus*. Elements of all of these associations occur on the Dales crons but there is much intergradation of the communities and it proved impracticable to

TABLE 1
Some physical and chemical data for Yorkshire crons

Determinand	Cam Gill	Clapham Beck	Kettlewell
Altitude m	290	250	290
Aspect	SE	WNW	E
Average slope, degrees	25	30	22
Length m	80	20	60
Discharge 1 s ⁻¹	0.5–5	0.5	0.5
Temperature °C	11.0	9.9	10.4
pH	8.1	8.1	8.1
TDIC* mM	3.3	2.49	3.46
Ca mg-at dm ⁻³	1.8	1.28	1.64
Mg µg-at dm ⁻³	53	62	75
Na µg-at dm ⁻³	105	200	220
K µg-at dm ⁻³	4	5	5
Cl µg-at dm ⁻³	130	160	200
SO ₄ µg-at dm ⁻³	105	98	120
total P µg-at dm ⁻³	0.7	0.10	<0.10
NO ₃ -N µg-at dm ⁻³	75	56	82
NH ₄ -N µg-at dm ⁻³	4.3	—	—
Calcite saturation index	4.50	2.25	3.90

* Total dissolved inorganic carbon.

Cam Gill cron was sampled on 15.9.90, the remainder on 26.5.91.

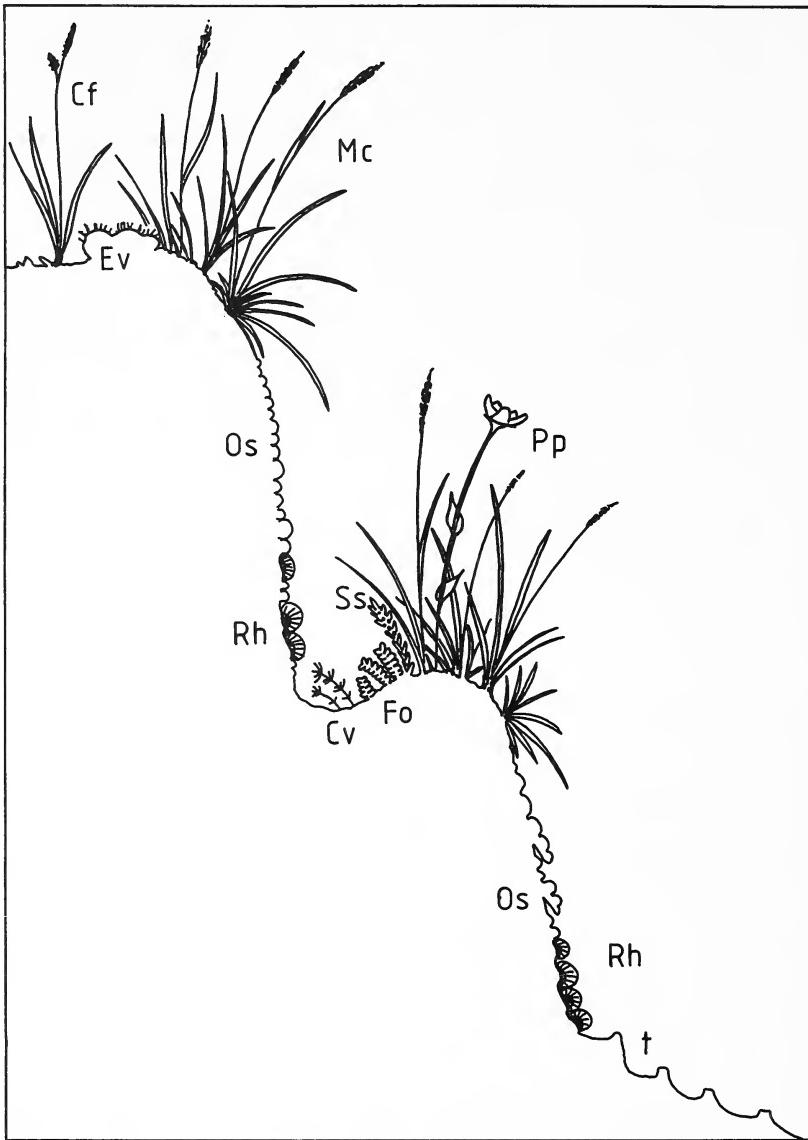


FIGURE 2

Diagrammatic section through Cam Gill cron showing some of the vegetation in relation to the topography. Cf, *Carex flacca*; Cv, *Chara vulgaris*; Ev, *Eucladium verticillatum*; Fo, *Fissidens osmundaoides*; Mc, *Molinia caerulea*; Os, *Oocardium stratum*; Pp, *Parnassia palustris*; Rh, *Rivularia haematis*; Ss, *Selaginella selaginoides*; t, small travertine terraces.

TABLE 2
The flora of three Yorkshire crons (Domin scale)

	Cam Gill	Clapham Beck	Kettlewell
1. Cyanobacteria			
* <i>Aphanocapsa endolithica</i> Erceg.	x	—	x
* <i>Calothrix</i> spp.	3	x	x
* <i>Phormidium incrassatum</i> (Naeg.) Gom.	—	—	x
* <i>Rivularia haemataites</i> (D.C.) Ag.	3	x	x
* <i>Schizothrix calcicola</i> agg.	3	x	3
<i>Homoeothrix crustacea</i> Woron.	4	x	3
* <i>Tolyphothrix tenuis</i> Kutz.	—	x	x
2. Algae			
* <i>Achnanthes minutissima</i> Kutz.	4	x	3
* <i>Amphora ovalis</i> (Kutz.) Kutz.	—	—	x
<i>Caloneis alpestris</i> (Grun.) Cl.	x	—	—
<i>Chara vulgaris</i> L.	2	—	—
* <i>Cladophora glomerata</i> (L.) Kutz.	2	2	1
* <i>Eunotia arcus</i> Ehr.	2	—	1
* <i>Gomphonema angustum</i> Ag.	3	—	—
<i>Gongrosira incrassans</i> (Reinsch.) Schmid	—	x	1
* <i>Oocardium stratum</i> Naeg.	4	—	—
* <i>Vaucheria</i> sp.	—	—	x
3. Bryophytes & lichens			
* <i>Bryum pseudotriquetrum</i> (Hedw.) Schwaeg.	3	4	5
* <i>Cratoneuron commutatum</i> (Hedw.) Roth.	4	4	5
* <i>C. filicinum</i> (Hedw.) Spruce	—	3	3
* <i>Ctenidium molluscum</i> (Hedw.) Mitt.	—	3	3
* <i>Eucladium verticillatum</i> (Brid.) Br.Eur.	4	4	—
* <i>Fissidens osmundoides</i> Hedw.	2	—	—
* <i>Gymnostomum recurvirostrum</i> Hedw.	3	—	3
<i>Jungermannia atrovirens</i> Schleich.	—	2	1
* <i>Pellia fabroniana</i> Raddi	1	1	2
* <i>Philonotis calcarea</i>	1	x	—
* <i>Preissia quadrata</i> (Scop.) Nees	x	—	x
* <i>Riccardia pinguis</i> (L.) Gray	x	x	x
<i>Scorpidium scorpioides</i> (Hedw.) Limpr.	x	—	—
<i>Verrucaria elaeomeleana</i> (Mass.) Arnold	—	—	x

continued...

TABLE 2 (continued)

	Cam Gill	Clapham Beck	Kettlewell
4. Phanerogams			
<i>Agrostis stolonifera</i> L.	—	1	—
<i>Caltha palustris</i> L.	1	—	—
* <i>C. flacca</i> Schreb.	5	—	4
* <i>C. lepidocarpa</i> Tausch.	4	5	4
<i>C. nigra</i> (L.) Reichard	—	4	—
<i>C. panicea</i> L.	—	—	4
* <i>Cirsium palustre</i> (L.) Scop.	—	3	3
<i>Crepis paludosa</i> (L.) Moench.	—	3	—
<i>Deschampsia caespitosa</i> (L.) Trin.	—	3	—
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	1	—	—
* <i>Equisetum palustre</i> L.	1	—	—
* <i>Eriophorum angustifolium</i> Honck	2	—	—
<i>Festuca rubra</i> L.	—	3	—
<i>Filipendula ulmaria</i> (L.) Maxim	—	4	—
* <i>Fraxinus excelsior</i> L.	—	x	—
<i>Hypochaeris radicata</i> L.	—	x	—
<i>Juncus acutiflorus</i> Hoffm.	3	—	—
* <i>J. articulatus</i> L.	—	—	3
<i>J. effusus</i> L.	4	—	—
* <i>Molinia caerulea</i> (L.) Moensch.	7	—	—
<i>Montia fontana</i> L.	—	x	—
* <i>Parnassia palustris</i> L.	3	—	—
* <i>Petasites hybridus</i> (L.) Gaut, Mey & Sch.	4	—	—
<i>Pinguicula vulgaris</i> L.	2	2	—
<i>Primula farinosa</i> L.	4	3	—
<i>P. vulgaris</i> Huds.	—	3	—
<i>Selaginella selaginoides</i> (L.) Link	3	—	—
* <i>Sesleria albicans</i> Kit. ex Schultes	7	8	8
<i>Valeriana dioica</i> L.	2	2	—
<i>Viola riviniana</i> Rehb.	—	1	—

* Recorded from the Belgian cronos.

classify the sites using them. *Cratoneuron commutatum* is a common bryophyte in damp calcareous habitats throughout Britain, and in the Dales it is frequently associated with *C. filicinum* and *Bryum pseudotriquetrum*. Similar *Cratoneuron* communities are widespread in Europe (Walther, 1942; Herzog & Hofler, 1944; Poelt, 1954).

Among the higher plants, *Sesleria albicans* is a major component of the drier cron surfaces in both countries, and is thought to help stabilise the travertine accumulations (van Oye, 1937). *Molinia caerulea* is also common to both areas, and is widely distributed in base-rich

wetlands of Britain. Despite the apparent similarity in the higher plant flora (Fig. 2) there are in fact a number of differences. The Belgian sites occur in open deciduous forest and are often colonised by trees. In the Dales, the growth of trees is probably discouraged by grazing. Several Orchidaceae occur on the Lorraine deposits, notably *Dactylorhiza incarnata*, *Epipactis palustris* and *Platanthera bifolia*. Although these species are known from northern England they have not been found on the crongs. Other characteristic species in Belgium are *Eupatorium cannabinum*, *Origanum vulgare* and *Angelica sylvestris*. *Eupatorium* is uncommon in the Dales, but is known from travertine deposits in southern England (unpublished observations). The Dales and Lorraine crongs are of a similar altitude, but differ by four degrees of latitude and this, together with effects of grazing, may explain the floristic differences of the two areas.

The water chemistries of the two regions are similar (van Oye & Hubert, 1936; Symoens *et al.* 1951; Pentecost, 1991). The waters are of the 'calcium bicarbonate type' with pH ranging from 7.5–8.3. Travertine formation occurs at all sites but the rate of deposition is unknown. However, at Cam Gill, encrusted colonies of *Oocardium* grew at a rate of about 1 mm per year (Pentecost, 1991). Levels of dissolved nutrients were low, but similar to those from many other springs in the Dales (unpublished results). Comparable phosphorus concentrations have been found in the waters of calcareous fens where phosphorus limitation, possibly attributable to coprecipitation with calcite, has been demonstrated (Boyer & Wheeler, 1989).

Over two hundred sites of travertine deposition are known in Britain, but the majority of these are now dry, or at least 'inactive'. Among the active sites, typical cron sites are uncommon. Travertine mounds, associated with mire vegetation have been described by Boyer & Wheeler (1989). These mounds lack the steep gradient and travertine-encrusted pools characteristic of crongs, and possess a different vegetation.

ACKNOWLEDGEMENTS

I am grateful to Dr M. O. Hill and Dr P. D. Moore for their assistance with some of the identifications.

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BOOK REVIEW

British Fungus Flora: Agarics and Boleti. Part 6: Crepidotaceae, Pleurotaceae and other Pleurotoid Agarics by Roy Watling and Norma M. Gregory. Pp. 157, including numerous line drawings. Royal Botanical Garden, Edinburgh, 1989. £10.00

This work represents the sixth volume of a series whose high levels of scholarship and of usefulness to professional and amateur mycologist alike are well established. It is particularly gratifying to Yorkshire workers that the senior author has such strong links with this county, where he cut his mycological teeth.

This volume differs from previous volumes in that its subject comprises a loosely morphologically-related group rather than a taxonomic one. Accordingly, the taxa dealt with here form a highly heterogeneous collection which includes many laterally stiped and some centrally stiped, gilled 'toadstools'; species with highly reduced gills such as are found in the genera *Arrhenia* and *Cyphellotereum*; the 'split-gilled' *Schizophyllum*; and *Paxillus panuoides*, which belongs with the boletes. The truly 'cyphelloid' species are not dealt with here, but their genera are listed, along with their putative agaric relatives, on page 123.

About thirty different genera are fully or tangentially treated here, these belonging to no fewer than nine families. There is no general consensus about agaric taxonomy at the ordinal level at the current time, and the current flora quite sensibly concentrates on the family as the major unit by which to organise the work. Major nomenclatural changes have taken place since the 1960 *New Check List*, and several new genera whose names will be unfamiliar to many appear in this work. The new arrangement is delineated alongside the 1960 version in the Introduction.

The main body of the work follows the pattern set by previous volumes with comprehensive descriptions, species by species, of macroscopic and microscopic characters, details of range and habitat preferences, and the very useful concluding paragraph which highlights closely related species and the major distinguishing characters which separate them. There are over 200 line figures showing habit sketches and/or drawings of spores, cystidia and other microscopical features.

In a work which deals with such a heterogeneous group it is slightly irritating that following the pattern of previous volumes the index is placed at the end of the text and before the illustrations, rather than at the end of the whole work. In addition, the species index is arranged by family rather than alphabetically, with the families arranged according to the sequence in which they are dealt with in the systematic part of the book; this seems to run counter to the purpose of an index and makes the book somewhat difficult to use until one is familiar with its layout.

This minor complaint aside, this book belongs on the shelves of all serious mycologists, not least because many of the species covered are intriguingly anomalous and little understood (the comment 'probably widespread but overlooked' is applied to a considerable number of them). Good descriptions of many of these taxa have not been generally available to field mycologists in the past and this volume will greatly help to remedy the situation.

CSVY

NATTERER'S BAT *MYOTIS NATTERERI* TAKEN BY SHORT-EARED OWL *ASIO FLAMMEUS*

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During late June, 1986 a number (20) of pellets of a Short-eared Owl *Asio flammeus* was collected in the Croasdale area, Forest of Bowland, Lancashire. The location was not associated with a known nesting site and the pellets were presumed to have been cast by an adult bird within its hunting territory.

The pellets were processed and analysed as part of a wider study on the summer diet of the species. One of the pellets was found to contain the remains of two Field Voles *Microtus agrestis* and what subsequently proved to be the skull of a Natterer's Bat *Myotis nattereri*. This latter identification was confirmed by Dr R. E. Stebbings (Institute of Terrestrial Ecology), who stated that the specimen was a young adult in its first year.

Various authors have shown that different owl species do occasionally take bats as prey (Beven 1965; Brown 1987; Cramp 1985; Glue 1970 and 1977; Glue & Hammond 1974; Mikkola 1983; Ruprecht 1979; Southern 1954; Yalden 1985). The Short-eared Owl would appear to be no exception with Pipistrelle Bat *Pipistrellus pipistrellus*, Northern Bat *Vespertilio nilssonii* and Noctule Bat *Nyctalus noctula* being recorded as prey within the Western Palaearctic area (Brown 1987; Cramp 1985; and Mikkola 1983).

Twelve recorded instances of Natterer's Bat being taken as prey by owls in Britain are known; one by a Tawny Owl *Strix aluco* and eleven by Barn Owls *Tyto alba* in Anglesey and Gwynedd, Wales (Brown 1987 and *pers.comm.*). From references available no similar behaviour is recorded by Short-eared Owl for Britain or within the Western Palaearctic.

Analysing all published sources it can be seen that far less than 1% of bats are taken as prey within the diet of owl species, which might suggest their capture to be entirely of an opportunist nature.

In the above instance the location at which the pellets were collected is at around an altitude of 380 m asl. The general area comprises a wide upland valley with a mixture of *Calluna* heath/grassland and occasional, but widely distributed, Rowan *Sorbus aucuparia*. The location was between 1.5–2 km from the first stands of mature trees and farm buildings at a lower altitude of 200 m asl.

Natterer's Bat is most frequently found in open woodland and parks. It roosts in hollow trees and within buildings and caves (Corbet & Southern 1977; Delany 1985). The species is medium sized (head and body 40–50 mm, weight (in hibernation) 7–12 gm) and hunts at night, emerging soon after sunset. It is a rather slow flyer and has a preference for hunting woodland edges or above/along hedgerows (Delany 1985). Circumstances suggest the owl may have been hunting at the interface of the moor/agricultural land where trees and hedgerows exist or that the bat was involved in travelling over the fell itself and was intercepted by the bird involved. Both these must obviously remain assumptions.

ACKNOWLEDGEMENTS

Our thanks are offered to Messrs P. Etheridge and P. Irving, who kindly made collections of pellets in the area and to Dr R. E. Stebbings (ITE) for providing a precise identification of the skull remains. Similarly, particular thanks are due to Dr D. W. Yalden (University of Manchester) for providing diverse information and comment, to D. Brown (NCC, North Wales) for making known the results of his own work on owl diets and the occurrence of bat species, to Mrs L. Giddings (RSPB Librarian) for assistance in checking references and to D. Glue (British Trust for Ornithology) for investigating past details relating to the diet of Short-eared Owls.

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BOOK REVIEWS

A Colour Guide to Rare Wild Flowers by John Fisher. Pp. 364, with 150 colour plates. Constable. 1991. £12.95, hardback.

This unusual publication in the Constable guide-book format, which really does fit into one's pocket, has already caused controversy. One hundred and fifty species of rare wild flowers are described and illustrated; some historical information is given, and the areas where the plants are to be found. For the flower 'twitcher' anxious to see unusual and rare plants the book should prove invaluable, but in the interests of the conservation of rare and endangered species, perhaps it is not wise to be so explicit about habitats and sites.

There is a very good select bibliography, and a list of the Nature Conservation Trusts. John Fisher is well-known as an excellent photographer, but some of the reproductions of his photographs could be better.

DMB

Between Earth and Paradise by Mike Tomkies. Pp. 224, with 39 colour plates. Jonathan Cape. 1991. £12.99, hardback.

This is a revised edition of a well-received book first published in 1981. It gives a wide and detailed survey of the problems involved in setting up a solo existence on a remote island off the North West coast of Scotland. The author records his observations of both the fauna and the flora. The treatment is simple, but helpful to the ordinary naturalist. One can but be impressed by the author's energy and hardihood; however, he clearly demonstrates that 'hermit-hood' is not for many of us. The location of the island is revealed and the book contains some good colour photographs.

DB

**NOTE ON A SUCCESSFUL BREEDING ATTEMPT BY AN IMMATURE
FEMALE PEREGRINE FALCON *FALCO PEREGRINUS*, IN THE
YORKSHIRE DALES**

STUART BROCKLEHURST

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Initial pair formation in the Peregrine Falcon usually takes place in the second year, the normal age of maturity for both sexes, when the blue-grey adult plumage is attained (Cramp & Simmons, 1980). A few females will pair up with adult males in their first year, whilst still in immature plumage, but the majority of these young falcons do not breed (Ratcliffe, 1980). Between 1981 and 1990 a number of such adult immature pairings have been recorded in the Yorkshire Dales, none of which resulted in successful breeding, although one female in 1984 did succeed in hatching her eggs, the young died a few days later (D. J. Simpson, *pers. comm.*).

Immatures which do attempt breeding lay their eggs later in the season or lay smaller clutches than older birds, and are usually unsuccessful. During a nine year study of Peregrine breeding success in south Scotland, two females each laid clutches of two eggs in their first year, but neither successfully reared young (Newton, 1979; Mearns & Newton, 1988).

Successful breeding by first-year females seems to be very exceptional. Ratcliffe (1980) gives only one record, of an immature-plumaged female seen feeding two young at a Perthshire eyrie in 1959. Newton (1979), gives three records, two from Alaska and one from Scotland, the latter perhaps the same as that quoted by Ratcliffe.

It is therefore of interest to record that in 1991 an immature female paired with an adult male and successfully reared a brood of two young at a site in the Yorkshire Dales. The juveniles, a male and a female, fledged during the third week of July and were seen to be fit and healthy when checked on the 19th, by which time the parent female was heavily in moult and in the process of gaining adult plumage.

The late fledging date, some 2½–3 weeks after other pairs in the district, may be accounted for by the immaturity of the female. Mearns & Newton (1988) state that in their study, performance improved as females aged, laying becoming progressively earlier and clutches progressively larger, from one to five-plus years. However, because the pair was not located until the young were about five weeks old, it is not possible to be certain if the brood of two is genuine, or a depletion from a larger initial clutch.

Interestingly whilst preparing this note I received an unconfirmed report that a first-year female at another Dales site, not checked by myself had also successfully bred, rearing one young from a clutch of two eggs. If the report is correct, then to have two immature females breeding successfully, within 17 km of each other in the same year, is quite remarkable.

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**BOTANICAL REPORT FOR 1990
FLOWERING PLANTS AND FERNS**

COMPILED BY J. E. DUNCAN

The thanks of the Recorders go to those members who have sent in records for the report, and to the referees who have kindly identified specimens or confirmed the identification. In each vice-county the names of recorders and referees are given in full the first time they appear, after which initials are used.

First records and confirmation of earlier records are included at the appropriate places in the report. The figures indicate 10 km grid references in the vice-county reports.

EAST YORKSHIRE (VC 61) (F. E. Crackles)

Asplenium adiantum-nigrum L. Walbut Lock, Pocklington Canal 44/74; YNU Bot. Sec. Excn.

Ranunculus penicillatus (Dumort.) Bab. var. *penicillatus* Drain, nr Thornton 44/74; L. Magee.

Hypericum maculatum Crantz subsp. *obtusiusculum* (Toulet) Hayek \times *H. perforatum* L. = *H. \times desetangii* Lamotte nm *desetangii*. A few feet from the Doncaster to Hull railway line and on a chalk bank, Hessle Country Park 54/02; F. E. Crackles.

Geranium pyrenaicum Burm. fil. Nr Thornton 44/74; T. E. Dixon.

G. lucidum L. Sandy bank of Blackfoss Beck, Thornton Ings 44/74; TED.

Trifolium striatum L. Haverfield Pits 54/31, confirming a 1946 record; FEC.

T. scabrum L. Haverfield Pits 54/31, confirming a 1946 record; FEC.

T. fragiferum L. On gravel, beside disused railway, Harswell 44/84; M. Hunter.

Saxifraga granulata L. In quantity in Towthorpe Dale 44/86 and 44/96; YNU Excn. There is a record in Robinson's Flora (1902) for Fimber which is in 44/86.

Viscum album L. In small orchard, Brind 44/73, present for 12 years and at Cliffe Cum Lund 44/63, known for 40 years; B. Greenacre.

Smyrnium olusatrum L. By lane, nr church, Hutton 54/05; J. Broadwell.

Rumex tenuifolius (Wallr.) Love Disused railway station, Harswell 44/84 and Sands Lane, near Barmby moor 44/75; MH and FEC.

Calluna vulgaris (L.) Hull The Moors, Burton Constable 54/13, 1988; YNU Excn.

Lithospermum arvense L. Fifty plants in arable field, nr Walbut Lock 44/74; D. R. Grant. The first VC 61 record since 1957.

Lycium chinense Miller Nr lighthouse, Spurn 54/41; FEC.

Melampyrum pratense L. Wood, Thornton Ellers 44/74, 1989; TED.

Bidens cernua L. Tophill Low 54/04; A. Marshall.

B. tripartita L. Tophill Low 54/04; AM.

Anthemis cotula L. Fitling and Grimston 54/23, 1989; FEC.

Lactuca virosa L. Broomfleet 44/82; P. Dunning and E. H. Wear.

Potamogeton berchtoldii Fieb. Thornton Lock, Pocklington Canal 44/74; DRG.

Dactylorhiza praetermissa (Druce) Soó Water-meadow, East Cottingwith 44/64; FEC.

Eleocharis uniglumis (Link) Schultes Water-meadow, East Cottingwith 44/64; FEC.

NORTH-EAST YORKSHIRE (VC 62) (T. F. Medd)

- Ranunculus hederaceus* L. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- Aquilegia vulgaris* L. Scar Wood, Harwood Dale 44/99; R. and M. Gulliver.
- Diplotaxis tenuifolia* (L.) DC By roadside, Bootham, York 44/55; T. F. Medd.
- Stellaria nemorum* L. Blue Scar Wood, Eskdaleside 45/80; R & MG.
- S. neglecta* Weihe Blue Scar Wood, Eskdaleside 45/80; R & MG.
- Atriplex glabriuscula* Edmondst. Skinningrove 45/72; R & MG.
- Euonymus europaeus* L. Thurtle Wood, Coneythorpe 44/67, Haugh Wood, Gundale 44/88 and Fotherley Farm Wood, Grosmont 45/80; R & MG.
- Vicia sylvatica* L. Slingsby Bank Wood and Fryton Wood 44/67; R & MG.
- Chrysosplenium alternifolium* L. Wedland Slack, Lockton 44/89 and Hayburn Wyke 45/09; R & MG.
- Daphne laureola* L. Golden Grove, Whitby 45/80; R & MG.
- Salix pentandra* L. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- Menyanthes trifoliata* L. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- Serratula tinctoria* L. Dunes, Skinningrove 45/72; R & MG.
- Convallaria majalis* L. Castlebeck Wood, Harwood Dale 44/99; R & MG.
- Epipactis palustris* (L.) Crantz Near Helmsley 44/68; F. Horsman. Confirmation of pre-1930 record.
- Dactylorhiza × venusta* (T. & T. A. Stephenson) Soó = *D. fuchsii* × *purpurella* Northdale 44/89, Sandsend 45/81 and Fyling Thorpe 45/90; FH.
- D. maculata* ssp. *ericetorum* (E. F. Linton) Hunt and Summerh. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- D. × kellerana* P. F. Hunt = *D. fuchsii* × *traunsteineri* Near Helmsley 44/68 and Dalby Forest 44/88; FH.
- D. × jenensis* (Brand.) Soó = *D. maculata* × *traunsteineri* Dalby Forest 44/88; FH.
- D. × claudiopolitana* (Soó) Soó = *D. incarnata* × *maculata* Dalby Forest 44/88; FH. Second vice-county record.
- D. purpurella* (T. & T. A. Stephenson) Soó Stape 44/79; Mrs N. Sykes det. FH. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- D. russowi* (Klinge) J. Holub Dalby Forest 44/88; FH. New British record.
- Eleocharis uniglumis* (Link) Schult. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn. New vice-county record.
- Blymus compressus* (L.) Panz. ex Link Near Helmsley 44/68; FH.
- Carex laevigata* Sm. Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- C. rostrata* Stokes Newton Mulgrave Moor 45/71; YNU Bot. Sec. Excn.
- Hordeolum europaeus* (L.) Harz Hilda Wood, Hackness 44/99 and Fotherley Farm Wood, Grosmont 45/80; R & MG.

SOUTH-WEST YORKSHIRE (VC 63) (D. R. Grant)

- Asplenium adiantum-nigrum* L. Lock wall, canal, Clifton nr Brighouse 44/12; YNU Bot. Sec. Excn.
- Nuphar lutea* (L.) Sm. Nr Sprotborough 44/50; E. Thompson.
- Ceratophyllum demersum* L. Pond near church, Birstall 44/22; D. Proctor.

- Cardaria draba* (L.) Desv. Wrenthorpe nr Wakefield 44/32; D. R. Grant.
- Hypericum androsaemum* L. Nr Digley Reservoir, Holmbridge 44/10; DRG.
- H. maculatum* Crantz Nr Sprotborough 44/50; ET.
- Spergularia rubra* (L.) J. & C. Presl River Calder bank, Kirkthorpe, Wakefield 44/32; DRG.
- Medicago sativa* L. Pildacre Hill, Ossett 44/22; DRG.
- Coronilla varia* L. Old Roundwood Colliery site, Ossett 44/22; DRG.
- Peplis portula* L. Agden Reservoir, Bradfield 43/29; DRG.
- Euonymus europaeus* L. Burghwallis 44/51; ET.
- Myriophyllum verticillatum* L. Dead Eye, Cononley 34/94; Freshwater Biol. Sec. Excn. First record since 1890.
- Oenanthe crocata* L. Canal, Stainforth nr Doncaster 44/61; T. Schofield.
- O. aquatica* (L.) Poir. Nr Sprotborough 44/50; TS.
- Foeniculum vulgare* Mill. Tip nr Newton Lane, Sprotborough 44/50; DRG.
- Humulus lupulus* L. Nr Low Laithes, Ossett 44/22; DRG.
- Parietaria diffusa* Mert. & Koch Birkby, Huddersfield 44/11; J. Lucas.
- Populus canescens* (Ait.) Sm. Lindale Hill, Wrenthorpe 44/32; DRG.
- Pyrola rotundifolia* L. Old gravel pits, Elland 44/12; A. Logue.
- Hottonia palustris* L. Nr Sprotborough 44/50; DRG.
- Echium vulgare* L. Kirkthorpe, Wakefield 44/32; C. Hartley.
- Scrophularia aquatica* L. Figure of Three Locks, Healey, Ossett 44/21; DRG.
- S. umbrosa* Dumort. River Aire, Thorlby, Skipton 34/95; TS.
- Orobanche minor* Sm. Old Colliery site, Upton 44/41; DP.
- Campanula glomerata* L. Old Colliery site, Upton 44/41; DRG.
- Galium verum* L. Earlsheaton, Dewsbury 44/22; DRG.
- Dipsacus fullonum* L. Brodsworth Colliery 44/50; TS.
- Bidens tripartita* L. Agden Reservoir, Bradfield 43/29; DRG.
- Luronium natans* (L.) Raf. Huddersfield Canal, Colne Bridge 44/12; TS. Nr Wellhouse, Huddersfield 44/01; JL.
- Alisma lanceolatum* With. Canal, Brookfoot, Brighouse 44/12; TS.
- Potamogeton pusillus* L. Rother Valley Country Park 43/48; ET.
- Zannichellia palustris* L. Old colliery site, Upton 44/41; DRG.
- Juncus subnodulosus* Schrank Nr Sprotborough 44/50; DRG.
- Epipactis helleborine* (L.) Crantz Nr Turner Wood, Kiveton 43/58; Dr L. Lloyd Evans. Walton Woods, Wakefield 44/31; DP.
- Ophrys apifera* Huds. Old colliery site, Havercroft, nr Wakefield 44/31; DP. Over 200 spikes in a small area.
- Acorus calamus* L. Canal, Stainforth, nr Doncaster 44/61; TS.
- Lemna polyrhiza* L. Doncaster 44/50; DRG.
- Scirpus lacustris* L. Old marl pit, nr Turner Wood, Kiveton 43/58; FWBS Excn.
- Eleocharis uniglumis* (Link) Schult. Rother Valley Country Park 43/48; DRG.
- Carex laevigata* Sm. Newholme Dean, nr Keighley 44/04.
- Vulpia bromoides* (L.) Gray Old colliery site, Calder Grove, nr Wakefield 44/21; CH. Old gravel pit, Elland 44/12; DRG.

MID-WEST YORKSHIRE (VC 64) (L. Magee)

A large number of interesting records were received from many parts of VC 64 including more records than usual from the Craven and Upper Wharfedale area. Many interesting records of rare or decreasing species have come from the Freshwater Biological Section which was re-activated in 1990.

* = New 10 km square records

Helleborus foetidus L. Increasing in Grass Wood 34/96; H. Lefèvre.

H. viridis L. In woodland, Smaws 44/44; P. Abbott.

* *Ceratophyllum demersum* L. Barlow Common 44/24; D. R. Grant.

Erophila verna (L.) Chevall. Old railway, Barlow Common, Selby 44/62; DRG.

Malva moschata L. Arthington Station 44/24; L. Magee; Harewood Estate 44/34; Freshwater Biol. Sec. meeting.

Sedum villosum L. Top of Crook Gill 34/97; DRG.

Ribes spicatum Robson Step Gill 34/97; PA. Riverside south of Buckden 34/97; PA.

R. alpinum L. Cray Gill 34/97; PA.

* *Callitrichia intermedia* Hoffm. Harewood Estate 44/34; FWBS field meeting.

* *Salix purpurea* L. Swinsty Reservoir 44/15; DRG.

Echium vulgare L. Arthington Station 44/24, LM.

Rumex longifolius DC. Roadside nr top of Silsden Moor 44/05; DRG.

Myosotis brevifolia C. E. Salmon Embsay Reservoir 34/95; L. Lloyd Evans.

Atropa bella-donna L. Roadside, Smaws 44/44; PA. Seacroft, Leeds 44/33; PA.

Veronica anagallis-aquatica L. Farmyard south of Buckden 34/97; LM.

* *Bidens tripartita* L. Roundhay Park Lake 44/33; PA.

Doronicum pardalianches L. Right bank of River Wharfe, Harewood Bridge 44/34; LM.

* *Carduus nutans* L. Roadside by Grass Wood 34/96; HL.

Leontodon taraxacoides (Vill) Meret. Buckden 34/87; YNU field meeting.

Pulicaria dysenterica (L.) Bernh. Stainforth 34/86; DRG.

Crepis mollis (Jacq.) Aschers. Starbotton 34/97; confirmation of old record (E. J. Roberts) PA.

Potamogeton pusillus L. Cawood Ings 44/53; DRG.

* *P. friesii* Rupr. Harewood Estate 44/34; FWBS field meeting.

P. friesii Rupr. Deep pool in River Wharfe south of Buckden 34/97; LM.

* *P. berchtoldii* Fieb. Pond at Arthington 34/24; FWBS field meeting.

Allium scorodoprasum L. Right bank of River Wharfe, Arthington 44/24; LM. River Skell nr Ripon 44/37; DRG.

Juncus filiformis L. First record for Swinsty Reservoir 44/15; DRG.

Epipactis palustris (L.) Crantz. Threshfield 34/96; rare in Upper Wharfedale, HL.

* *Dactylorhiza praetermissa* × *D. purpurella* (T. and T. A. Stephenson) Soó Lawkland Moss 34/76; new County record. F. Horsman.

* *Eleocharis uniglumis* (Link) Schult. Arncliffe 34/97; DRG.

Carex pendula L. Pond nr Burley Church 44/14; LM. Wharfe View, Burley 44/14; LM.

C. paniculata L. Harewood Estate 44/34; FWBS field meeting.

- * *Scirpus sylvaticus* L. Harewood Park 44/34; FWBS field meeting; junction of Kex Beck and River Wharfe 44/05; LM.
- * *Hordelymus europaeus* (L.) Hartz. Crook Gill nr Cray 34/97; DRG.
- Apera spica-venti* (L.) Beauv. Barlow Common 44/62; DRG.

CASUALS AND ADVENTIVES (E. Chicken)

During the year 1990, there were 51 records received of 39 taxa from twelve individuals and two groups. Despite the long hot summer, the number of records was considerably lower than that for the previous year. Apparently it was too dry, resulting in crop failure and re-ploughing in some of the fields treated with shoddy in the Wakefield area. Three unusual *Trigonella* species were found there in 1989 and are included in this list. Perhaps it should be mentioned that it can take quite a long time to get specimens of difficult plants determined or confirmed. The Trigonellas, and more surprisingly, Garden Lobelia are new entries to the card index.

The contributor is the determiner unless otherwise stated. The fields treated with wool shoddy between Leeds and Wakefield are given as E. Ardsley.

Sisymbrium irio L. (63) E. Ardsley SE 2924; J. Martin.

Montia perfoliata (Willd.) Howell (61) Under beech at Scampston Park SE 8675; B. S. Pashby and Mrs S. Pashby.

Staphylea pinnata L. (64) In a wood at Knaresborough SE 3559; Harrogate and District Nat. Soc. per L. Magee.

Trifolium angustifolium L. (63) E. Ardsley SE 2924; JM 1988 and 1989, conf. EC.

Trifolium hirtum All. (63) E. Ardsley SE 2924; JM 1989, conf. EC.

Trigonella coeruleyriaca Boiss. (63) E. Ardsley SE 2924; JM 1989, det EC conf. E. J. Clement.

Trigonella hamosa L. ssp. *uncata* (Boiss. et Noë) Townsend (63) E. Ardsley SE 3123; JM 1989, det. EJC.

Trigonella stellata Forssk. (63) E. Ardsley SE 2924; JM 1989, det. EJC.

Duchesnea indica (Andr.) Focke (62) Woodlands Ravine, Scarborough TA 0288; Mrs M. Robinson, det. EC.

Rosa rugosa Thunb. (61) Emmotland TA 0851; EC.

Crassula helmsii (T. Kirk) Cockayne (63) Pool at Lane House, Holmfirth SE 1604; Mrs J. Lucas.

Saxifraga hirsuta L. (64) Step Gill, Buckden SD 9375 and Chapel-le-Dale SD 7377; YNU meeting per Mrs P. P. Abbott, and Horton-in-Ribblesdale SD 8172; PPA, all per LM.

Fallopia aubertii (Louis Henry) J. Holub (63) Wall of old maltings, Kiveton Park SK 5082; D. R. Grant.

Rhododendron ponticum L. (64) Jowlands Whin, Barlow SE 6226; DRG.

Buddleja davidii Franch. (63) Newton Lane tip, Sprotborough SE 5502; DRG.

Physalis alkekengi L. (63) Whlestone Moor SE 0716; JL.

Datura stramonium L. (61) Roadside verge, Ruston Parva TA 0661; S. Burdass per BSP, 1989. (63) E. Ardsley SE 2924; JM.

Misopates orontium (L.) Raf. (63) Garden weed at Horbury SE 2918; C. Hartley.

Lobelia erinus L. (61) Between pavement and wall, Driffield TA 0257; EC.

- Doronicum pardalianches* L. (61) Grass verge at Reighton TA 1273; BSP and SP.
- Chionodoxa luciliae* Boiss. (62) Wood at Keldholme SE 7186; LM.
- Juncus tenuis* Willd. (64) Roundhay Park lake, Leeds SE 3337; PPA.
- Allium paradoxum* (Bieb.) G. Don (64) By the R. Skell, Ripon SE 3070; I. Instone per DRG.
- Bromus secalinus* L. (61) Weed in arable field, Brigham TA 0653; EC.

YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 1989

COMPILED BY C. S. V. YEATES AND W. A. ELY

Thorpe Hall, Rudston (VC61) 19 August (B. S. Pashby)

On a fine warm day members met in the estate yard from where most parts of the estate were visited. The area lies on the chalk, with a narrow band of alluvium along which the Gypsy Race normally flows. Due to the almost unprecedented dry spring and summer this stream was virtually dry, just as it was in its upper reaches in the north-west Wolds, which is most unusual.

The meeting for the presentation of reports was held in the village hall at Rudston. An apology was received from the President, Dr Thompson, explaining his inability to attend, and in his absence Mr A. J. Wallis took the Chair. Twenty-three members attended, with eighteen societies answering the roll-call. Comments made included the obvious one about conditions being far too dry and that the estate was an oasis in a desert of intensive farmland.

Votes of thanks were proposed to Sir Ian McDonald of Sleat, Bt. for permission to explore the Thorpe Hall Estate; to Mr Tony Ezard for his valuable help and provision of excellent maps of the area; to the Divisional Secretary for organising the excursion and to Mesdames Jean Chicken and Shirley Pashby for providing most welcome cups of tea.

ORNITHOLOGY (A. J. Wallis)

The list of species recorded (31 in all) was low for an area with such a varied range of habitats. This was not altogether surprising bearing in mind the time of year, when it is not possible to detect the presence of many species by song.

Where there was still some water in the Gypsy Race a Kingfisher was seen, a species which in 1984 was watched on several occasions in Rudston village catching moths. At least 12 Snipe were present, and both Mallard and Teal were put to flight. The Moorhen was clearly successful in the locality with at least 15 adults noted and juveniles seen in two places.

On a well-hidden pool in the middle of a ploughed field a gathering of some 500 gulls – Common and Black-headed – had collected to bathe, and a single Green Sandpiper was present. The latter did not fly off immediately, but eventually did take wing when a Stoat dashed to cover across the dry mud at the pool edge.

Swallows and House Martins were numerous, particularly around the farm buildings, and fields almost white-over with fruiting heads of Creeping Thistle were attractive to several charms of Goldfinches.

One noticeable feature was the almost total absence of corvids. A few Rooks were following a tractor harrowing a field and some Jackdaws were noted, but that was all.

COLEOPTERA (M. L. Denton)

The near-complete lack of water in the usually flowing Gypsey Race did at least allow the mud and vegetated edges to be searched for beetles. The only species found, however, were a few of the commoner members of the genera *Elaphrus*, *Bembidion*, *Stenus* and *Gabrius*. The brightly coloured, although very small chrysomelid *Prasocuris junci* was also present, in association with *Veronica beccabunga*, its main food-plant. Due to the dry conditions the only water beetles found were a mixed group of aestivating *Agabus didymus* and *A. paludosus*.

Inspection of fruiting-bodies of the fungus *Pleurotus cornucopiae* in the garden area of the estate revealed the presence of several Aleocharines. The genus *Gyrophaena* was represented by four species: the most numerous was *G. gentilis*, followed by *G. fasciata* (first vice-county record), a single male *G. bihamata* (fourth county record), and a single male *G. poweri* (new to Yorkshire). Not only do the males of this genus have very distinctive genitalia, but the apical segment of the hind-body is adorned with characteristically shaped ornate formations. Dung in a bullock field held only the usual *Atheta*, *Cercyon* and *Aphodius* species.

A list of beetles previously recorded from the estate had been prepared by Mr Ezard. However, because non-specialised collecting techniques had been employed, only the more easily-procured species had been found. The different techniques used on the present visit, therefore, ensured that a number of species were added to the list, even though only 69 species in all were collected. This paucity of species, it must be stressed, was not a reflection on an impoverished site, but was due to the dry weather conditions and time of year.

LEPIDOPTERA (A. S. Ezard & J. A. Newbould)

A moth-trap situated by the side of the dried-up Gypsey Race at the lower end of the gardens yielded a freshly-emerged specimen of Pale Prominent. This was the first record of a second brood individual of this species here, although the first brood is met with each year. Among the other 16 species in this trap was the Bulrush Wainscot, which is taken annually at this site in small numbers.

The fine sunny weather encouraged 10 species of butterfly to make an appearance. Painted Lady and Red Admiral were to be found feeding on thistles, while on the unimproved chalk hillside a Small Copper was sunning itself, Common Blue was seen and a late, tattered, Meadow Brown flew past.

Another 10 species, including 5 micro-lepidoptera, were added during the day. These included *Leucoptera laburnella*, identified from its abundant mines in *Laburnum* leaves, and a new record for the area.

FLOWERING PLANTS AND FERNS (E. Chicken)

The Thorpe Hall Estate is one with a wide variety of habitats, and was known to have over 300 species of vascular plants growing within it. The result of the hot and dry season was that many plants had flowered and died down, and a not too exciting day had been anticipated by some; in fact the dryness brought unexpected results.

The feeder stream and the lake had dried up, making it possible to wander up the bed of the stream and make observations more easily than in a normal season. By following this course of action a considerable quantity of *Mentha x smithiana* was discovered and initially caused much discussion. It was interesting to note that many plants which one would expect in this habitat were still to be seen surviving in the mud, albeit dwarfed and in small quantity, *Veronica anagallis-aquatica* being a case in point. The lake bed was green over with *Rorippa palustris*, *Chenopodium rubrum* and *Rumex maritimus*. Many regarded this last as the find of the day. Other plants of note in this habitat were *Mimulus guttatus*, *Gnaphalium uliginosum* and a large stand of *Carex riparia*.

The low lying woodland contained an *Aconitum* and *Campanula latifolia*, both past flowering, and also *Melica uniflora* and *Carex pendula*, neither of which is at all common in the vice-county. The pasture on the chalk held *Knautia arvensis* and *Scabiosa columbaria*

along with *Campanula glomerata* and *Filipendula vulgaris*.

The hay-meadow to the west of the Hall still had some *Senecio aquaticus* in flower, and a single stem of *Lychnis flos-cuculi* still survived the drought. Weeds in the arable land were mostly over or of little interest, but a solitary *Cirsium eriophorum* was seen. Two species close to buildings were *Verbascum thapsus* and *Chelidonium majus*, and perhaps the most surprising find was a plant of *Pteris cretica* well-established at gutter level on the derelict orangery, which also had *Helxine soleirolii* growing on its walls and floor.

The estate is too extensive to be done justice by any one individual in one day and it is probable that some areas such as the woodland on the higher ground were not seen by anyone at this particular meeting; so the location was far from being exhausted of possibilities after a most interesting day.

BRYOLOGY (T. L. Blockeel)

In spite of the very dry conditions, some productive bryologising was possible in the vicinity of the ponds. Particularly pleasing was the abundance of the liverwort *Riccia cavernosa* on exposed mud, associated as it often is with the moss *Physcomitrella patens*. The *Riccia* is a very rare species in the East Riding: the dry summer had obviously favoured it in this locality.

The bushes and trees on the banks of the ponds had a fairly rich epiphytic flora, no doubt due in part to the relatively high humidity which is normally available. *Metzgeria fruticulosa* was locally plentiful on *Salix* in one place, and there were a few tufts of *Ulota bruchii* (*U. crispa* var. *norvegica*). The *Metzgeria* is known elsewhere in the East Riding only at Danes Dyke at Flamborough, and the *Ulota* was previously thought to be extinct. Other epiphytes included three species of *Orthotrichum*, *O. Affine*, *O. diaphanum* and *O. pulchellum*, which were found on *Sambucus* and *Salix*.

Drepanocladus aduncus and *Amblystegium riparium* occurred on wood and debris at the pond margins. An interesting piece of shaded stonework, also by the pond margin, had the thallose liverworts *Conocephalum conicum* and *Pellia endiviifolia*, and the mosses *Eucladium verticillatum* and *Leptobarbula berica*. The latter species, overlooked in Britain until a few weeks ago, is now known from some five stations in Yorkshire. This new one at Thorpe Hall is a further extension of its range northwards in the country.

Other habitats, including the chalk grassland, were largely unproductive. *Gyroweisia tenuis*, however, was found at the base of the north wall of the Hall, and *Physcomitrium pyriforme* was on the banks of the Gypsy Race in pasture.

MYCOLOGY (C. S. V. Yeates)

The Thorpe Hall area is one of the mycologically better known areas within the vice-county, and given the time of year and the hot conditions it was not expected that anything new or exciting would turn up. A pleasant exception, therefore, was finding the downy mildew *Peronospora jacksonii* on *Mimulus*. There are few British records of this species, and no previous Yorkshire ones.

Lockton (VC62) 10 June (M. A. Atherden)

Although the summer of 1989 was exceptionally hot and dry, this meeting took place near the beginning of the summer, when the vegetation was still green. Overnight rain gave way to hazy sunshine as a fairly large party gathered in Lockton village. The study area was the Levisham Beck valley between Levisham Mill and Farwath. The land is now owned by the North York Moors National Park, who were delighted to welcome the YNU to this fascinating and beautiful part of their estate.

The Levisham Beck rises in the Hole of Horcum and flows south to join Pickering Beck at Farwath. The valley has been greatly over-deepened by glacial meltwater, and the stream is a classic 'misfit' which has meandered over the alluvial valley floor to leave several ox-bow

features. The valley floor is marshy, drainage being impeded by the presence of impervious Oxford Clay below the surface. The steep valley sides, by contrast, are cut through well drained Upper Jurassic limestones and calcareous grits.

Recording was concentrated in the rich deciduous woodlands of the valley sides and the marshlands in the valley floor. The Hagg Wood Marsh Nature Reserve proved a great attraction and many naturalists homed in on this area, managed with the help of the Yorkshire Wildlife Trust. There was a good representation of groups being studied and the day proved very rewarding. The afternoon ended with tea and the business meeting in Lockton Village Hall.

ORNITHOLOGY (M. J. A. Thompson)

Four distinct habitats were noted along the walk from Lockton village to Hagg Wood Marsh, and in each a different set of birds was observed. Firstly, in and around the village itself, House Martins, Swallows and Swifts were present in good numbers, along with a number of garden birds, including Pied Wagtail and Collared Dove.

On the gorse-covered valley sides, which were intersected by some deteriorating stone boundary walls, Yellowhammers, mostly males, were seen. A single Wheatear was sighted, possibly still on migration, as well as resident Linnets, Goldfinches, Rooks and Woodpigeons. A Curlew was heard in this vicinity. The occasional Black-headed Gull flew northwards up the valley.

The woodland surrounding Hagg Wood Marsh and covering the lower slopes produced the most bird species. Both Willow Warbler and Chiffchaff were singing, as were two Wood Warblers directly adjacent to the marsh. Blackcap was seen. Amongst the oaks a single Redstart was noted, with a Goldcrest in coniferous woodland. Long-tailed Tits were breeding in the area and a Tree Pipit was performing its song-flight on the edge of the marsh.

Goldfinch, Greenfinch and Chaffinch were seen in the reserve, all showing evidence of breeding. Cuckoo was heard calling in the valley and a male Great Spotted Woodpecker flew over. A single Sparrowhawk sped through the reserve, the only bird of prey observed. In all 38 species were recorded.

MAMMALS AND LOWER VERTEBRATES (M. J. A. Thompson)

Judging by the number of mole-hills, especially in the fields around the village and the drier areas of Hagg Wood Marsh, this species was well represented. The only other mammal species recorded were a single sighting of a Roe Deer, plus numerous slots, along with field Vole tunnels located under matted grass.

A single Adder was reported in the area. Several Common Frogs were seen, as was a single Palmate Newt in the pond complex just outside the reserve. A single female of this species was recorded by the writer from this same area in 1976 (*Naturalist* 1979: 949 p.66), indicating that it is well established here.

Brown Trout were noted in the stream feeding into Pickering Beck.

MOLLUSCA (A. Norris)

The marshy grassland and tall swamp which comprises the bulk of the Nature Reserve provided a rich and varied molluscan fauna, with 24 out of the 33 species recorded from the reserve being found in this habitat. The richness of the molluscan fauna is emphasised by the occurrence of three species of *Vertigo*: *V. antivertigo*, *V. substriata* and *V. pygmaea*, as well as other local marshland species such as *Punctum pygmaeum* and *Zonitooides nitidus*.

The most unusual species recorded from this area was *Cochlodina laminata*, a species normally associated with ancient woodland, and not normally found in swampy areas.

The drier habitats, such as the unimproved grassland, produced little evidence of Mollusca, probably as a result of the long, hot, dry spell of weather over this period. This area, and parts

of the dense scrub, should produce a number of species not recorded on the day, and I would expect the total list for the reserve to exceed 40 species.

COLEOPTERA (M. L. Denton)

The coleopterists in the party spent most of the day within the confines of the YWT reserve and were richly rewarded. As most beetle species are small and black it is pleasurable to record several which are more pleasing to the eye. The bright green chrysomelid *Chrysomela aenea* was found in good numbers and a close (but much more common) relative, *C. polita* was also present. The yellowish chrysomelid *Phytodesctra pallida* was found in the marshy area. In the same vicinity, but on *Crataegus*, was the decidedly rare chrysomelid *Orsodacne cerasi*. This species is southern in distribution, Yorkshire being on its northern limit.

Another splendid beast, the soldier beetle *Cantharis abdominalis*, was thinly distributed throughout the reserve. Although this species is now recorded more frequently than has been the case in the past, it is still decidedly rare. The longhorn beetles were well represented, with *Grammoptera ruficornis*, *Leiopus nebulosus*, *Rhagium bifasciatum* and *R. mordax* being encountered.

The small ponds just outside the reserve held the reed beetles *Donacia simplex* and *Plateumaris sericea*. Although the former is relatively common it can only be found where the food plant *Sparganium erectum* is abundant. On the other hand, the *Plateumaris* is far more catholic in its choice of food and can be found on a wide variety of aquatic plants. The smaller, less colourful (but to the writer's mind more interesting) beetles were sieved from the numerous piles of horse dung. Rove beetles were well represented, with *Atheta ischnocera* providing the second vice-county record and *A. laevana* the fourth. Searching under bark revealed the presence of *Leptusa norwegica*. This rove beetle is decidedly rare, with only three previous Yorkshire records.

A complete list of the species encountered within the YWT reserve has been lodged with the Chairman of the Management Committee.

LEPIDOPTERA (J. Payne)

During the walk from Lockton to Hagg Wood Marsh and back 8 species of butterfly and 13 macro-moths were seen.

Small Tortoiseshell larvae were feeding on nettles in an exposed situation.

There were two particularly rewarding recording areas. The sloping grass field N of the reserve held an abundance of *Conopodium* and *Rumex acetosa*. The former is the food-plant of the larvae of the Chimney Sweeper, a black geometrid day-flying moth, several of which were flying. The latter is fed upon by Small Copper larvae, and a single example of this butterfly was reported. Another moth seen flying in numbers here was the Burnet Campion, a brown and orange noctuid which flies in the sun.

OTHER ARTHROPODS (P. Lee)

The total of thirteen millipede species recorded on this meeting would normally signify an excellent day's collecting in a rich site, but for some reason the other groups collected were nothing like as abundant or diverse in species. A relatively long time was spent in 10 km square 44/89 en route to Hagg Wood Marsh, as this was the less well-recorded of the two squares visited. Although the area surveyed was small, and consisted mainly of roadside verges, nine species in four groups were new to the square. These were mainly common species, but the harvest-spider *Lacinius ephippatus* and the millipede *Polydesmus inconstans* are less commonly encountered, and the millipede *Macrosternodesmus pallicola* is worthy of special mention. Despite the generic name this is the smallest of the British species; a tiny, white, flatback millipede resembling a mobile root-hair as much as anything. Previously considered a rarity it is now being noted with increasing frequency throughout the county, but

this is only the second vice-county record. Four more flatback millipedes were found and it is unusual to find so many species of this group in one area at the same time.

Centipedes were very hard to collect, with only single specimens of four species found. The record of *Lithobius melanops* (new to 44/88) was somewhat out of the ordinary in that it came from woodland at Hagg Wood Marsh, whereas it is normally associated with coastal or synanthropic sites.

ENTOMOLOGY (W. A. Ely)

Mr Newbould and I took the high road from Lockton, along the rim of the eastern side of the Levisham valley. In the first 'field' after the village were the capsid bugs *Lygus wagneri* and *Orthops basalis*, which are more frequent in VC62 than in other areas. The flies included the carnivorous *Empis opaca* and *E. planetica*, the scuttle flies *Conicera floricola* and *Phora tincta*, the hoverfly *Parasyrphus punctulatus* and the acalyptères *Scoliocentra caesia* and *Philygria vittipennis*. The second field was rough grazing and here both bugs were again present, the empids included *E. opaca* again and *Oedalea zetterstedti* and the ichneumons included *Exyston sponsorius*, a sawfly parasite, *Glypta ceratites*, a parasite of Lepidoptera and *Tersilochus heterocerus*, a parasite of pollen beetles, and all three were new to VC62. Between here and the valley bottom was a steep, gorse-covered bank which produced the froghopper *Javesella forcipata*, the acalypterite flies *Cnemacantha muscaria*, a rare fly which has not been recorded in Yorkshire before, *Lyciella quadrivittata*, *Tetanocera phyllophora* and *Philygria sexmaculata*, the ichneumon *Glypta trochanterata*, new to VC62, and the wasp *Nysson spinosus*. This slow but profitable traverse left little time to explore Hagg Wood Marsh. *Lygus wagneri* was found again and the snipe fly *Spania nigra*, the empids *Rhamphomyia anomalipennis* and *R. stigmosa* and the hoverflies *Orthonevra brevicornis* and *Neoacsia obliqua* were also recorded.

FLOWERING PLANTS AND FERNS (D. R. Grant)

Members left the western end of Lockton village and followed the footpath which is situated on Upper Jurassic calcareous grit. Near the village small cliffs held *Cystopteris fragilis* and *Myosotis sylvatica*. Other calcicoles in the grassland included *Primula veris*, *Helianthemum nummularium* and *Plantago media*. Further along the bank there was evidence of leaching and of the underlying Oxford Clay strata. Here were *Ulex europaeus*, *Calluna*, *Vaccinium myrtillus* and *Digitalis purpurea*.

Along the stream-side in the bottom of the valley there were *Chrysosplenium oppositifolium*, *Crepis paludosa* and *Luzula sylvatica* growing under a canopy of *Corylus* and *Sorbus aucuparia*.

The Nature Reserve was dominated by large colonies of *Carex acutiformis* and *C. disticha*, and there were also areas of *C. paniculata*. It was pleasing to see a large number of young plants of the latter. Other sedges of note here were *C. lepidocarpa*, *C. echinata*, and *C. pallescens*. In the grassy open part of the bog were *Pedicularis palustris* and *Dactylorhiza fuchsii*.

The most spectacular plant on the Reserve was *Trollius europaeus*, which was in full bloom. In one area there were a few bushes of *Myrica gale*, while under light tree cover *Eupatorium cannabinum* formed small colonies and there were scattered plants of *Dryopteris carthusiana*. The northern part of the Reserve had a stand of *Phragmites*.

A small pond near the eastern end of the Reserve held *Typha latifolia*, *Lemna minor* and *Potamogeton berchtoldii*.

Nearer to Farwath the marshy fields had *Dactylorhiza maculata* ssp. *ericetorum*, *Carex ovalis*, *C. hirta* and *Juncus acutiflorus*. The lower slopes of the valley had much *Conopodium majus*, growing with *Stachys officinalis*, *Lathyrus montanus* and *Sanguisorba officinalis*. Under light shade were both *Primula vulgaris* and *Dryopteris affinis*, indicating that although the soil was acid there were alkaline pockets, enabling calcicoles to flourish.

MYCOLOGY (C. S. V. Yeates)

When a nature reserve forms part of the day's collecting sites, it is not always the case that the best fungi are found there, but in this instance the Hagg Wood Marsh reserve was indeed the most rewarding area, with plenty of warm, damp corners in which to crouch.

The open marsh areas produced considerable quantities of discomycetes on the dead stems of woody and herbaceous plants. Among those with few Yorkshire records was *Mollisia fuscostriata* on dead stems of *Filipendula ulmaria*. This is one of the more readily recognised members of a distinctly tricky genus.

Myrica has several species restricted to it and accordingly a lot of time was spent scrutinising dead twigs and branches of this substrate. Two species eventually came to light, both on the base of a dead shrub. These were the discomycetes *Hyalotricha corticola*, with its attractive steel-grey hairs, and *Dasyscyphus sulphurellus*, which as its name suggests is a yellow species; it too has hairs but these are much shorter and are tipped with large crystals of calcium oxalate. Of these two species the former has been recorded once before in the county, from this very site by Mr W. G. Bramley almost twenty years previously (one is conscious, as a latter-day mycologist, of walking in giant's footsteps in this area, long Mr Bramley's happy hunting ground!). The *Dasyscyphus*, it is therefore gratifying to be able to report, is new to Yorkshire.

In an area of alder carr, among a number of fungi found on decaying *Ilex* leaves, was the hyphomycete *Anungitea fragilis*, another species which has no previous Yorkshire records.

PLANT GALLS (J. A. Pearson)

A total of 30 plant galls was recorded during the day, among which was *Dasineura acrophila*, which develops on the leaves of *Fraxinus excelsior* and looks and feels like a small pea-pod, the leaflet mid-rib developing a hard and swollen core. Another fly, *Chirostia betuleti*, which causes terminal loose mop-head shaped galls on fronds of ferns, was observed on *Athyrium filix-femina* and *Dryopteris filix-mas* and *D. dilatata*.

Several observers noted the attractive bright orange aecial stage of the rust *Triphragmium ulmariae* on *Filipendula ulmaria* in the marshy grassland. ¶

The most interesting record of the day was of the mite gall caused by *Eriophyes malinus* on *Malus sylvestris*, found by Miss Molesworth. Mr Savage informs me that he has only one other record of this gall.

Fryston Wood (VC63) 22 July (T. Higginbottom)

On a warm humid morning forty members and friends met in a lay-by beside the B6136 Knottingley to Castleford road.

Fryston Wood is a horseshoe-shaped woodland on the Magnesian Limestone and lies to the south of the Fairburn Ings Nature Reserve. The new housing estates of Castleford are encroaching towards its western boundary, while to the east can be seen the fly-ash tips and cooling towers of the Ferrybridge power station. Most of this unmanaged woodland is covered by silver birch and willow scrub, although there are areas of a more open nature which support a flora typical of limestone grassland.

It was thought that the varied flora may support a variety of insects. Many butterflies were seen during the visit, but other members of the Entomological Section seemed to have little of interest to report. The woodland is used extensively by local people and these regular disturbances seem also to have diminished its value to birds and mammals.

The future of the woodland is rather uncertain. Even if the potential extension of housing can be resisted, the botanical and entomological interest of the woodland depends upon controlling the development of the birch and willow scrub.

The Yorkshire Wildlife Trust also gave permission to members to visit a small limestone quarry near Cridling Stubbs, a site well known to conchologists. Spring Lodge Quarry is to be

officially opened later in the year in memory of Christine Hoyle, a former member of the Castleford Naturalists' Society, who helped to save this important site. Recommendations as to how the quarry should be managed were passed on to the YWT Field Officer, Mr Stephen Warburton.

OTHER ARTHROPODS (P. Lee)

While Fryston Wood produced new 10 km-square records for two centipedes, one harvestman and three millipedes, these were all common species; the records reflect the lack of recording in this area rather than any particular richness of the site. Indeed, the site appears to have a low species diversity among the other invertebrate groups, considering its calcareous nature. The dry weather doubtless played its part in driving individuals deep into the soil and the noticeable lack of dead and decaying wood reduced considerably the micro-sites available for them to shelter from adverse conditions.

Spring Lodge Quarry is, in comparison, a better recorded site and in spite of the dry conditions it proved much richer both in species diversity and in numbers of individuals. The centipede *Lithobius melanops*, the harvestmen *Lacinus ephippiatus* and *Leiobunum rotundum*, the millipede *Ophyiulus pilosus* and the woodlouse *Haplophthalmus mengei* all constituted new 10 km-square records. The presence of *L. melanops* is indicative of human influence on the site.

COLEOPTERA (M. L. Denton)

It was obvious from the start that the new YWT reserve at Cridling Stubbs Quarry held great potential. It was unfortunate, however, that the prolonged dry conditions inhibited any serious collecting.

As Magnesian Limestone areas such as this are generally rich in snail species, it was perhaps not surprising to find the snail beetle *Cychrus caraboides* at this site. Britain's largest rove beetle, the Devil's Coach-horse *Staphylinus olens* was also present.

Beetles in Fryston Wood were also rather thin on the ground, and it was not until numerous decaying fungi were inspected that any numbers were encountered. The rove beetle *Ortholestes tesselatus*, an impressive beast with gold and black pubescence, was found in this medium. Several other members of the Staphylinidae (mainly Aleocharines) were also present, but all proved to be species widely distributed within Yorkshire and do not call for comment.

The presence of the weevil *Gymnetron antirrhini* was revealed by inspecting the flowers *Linaria vulgaris*. The larvae of this weevil cause galls on this plant, the corolla becoming swollen and the flower remaining closed.

Although very little was found on this visit, the coleopterists present considered that further work would prove rewarding.

ENTOMOLOGY (W. A. Ely)

The YWT Reserve had a variety of insect life which included a few less common species. The scuttle fly *Phora edentata*, the large-headed fly *Tomosvaryella kuthi* and the hoverfly *Pipzella viduata* were collected, together with the ichneumon *Heterischnus nigricollis* and the solitary bee *Lasioglossum rufularse*. Among the mined leaves were those of Ploughman's Spikenard with mines of the fly *Phytomyza conyzae* and those of Ox-eye Daisy with mines of *P. leucanthemi*.

The shaded footpath through Fryston Wood produced the tree-living froghoppers *Eurhadina loewii*, *Eupteryx atropunctata* and *Ossiannilssonola callosa*. The open area north of the caravan site had the bug *Dicyphus annulatus*, the froghopper *Turritus socialis* and the large-headed fly *Tomosvaryella nigritula*, as well as two galls – those of the gall mite *Aceria origani* on *Origanum* and those of the gall midge *Cystiphora sanguinea* on *Hieracium*.

Bilton Banks (VC64) 22 July (D. P. Savage)

ORNITHOLOGY (M. J. A. Thompson)

Although some 41 species of birds were observed by members in a variety of habitats, which included dense woodland, river banks and the more open areas of the dismantled railway, only a number are dealt with in this report. The most spectacular bird seen on the River Nidd was the Kingfisher along with Mallard, mostly in eclipse, and the Grey Wagtail. The adjacent Woodland Trust-owned Bilton Wood contained Blue Tit, Marsh Tit, Coal Tit, Treecreeper and Goldcrest. From the viaduct, at the edge of the wood, a Spotted Flycatcher was seen feeding. A Robin, with young, was reported from the woodland area, along with vocal and nest-hole evidence of Great Spotted Woodpecker. Later, both this species and the Green Woodpecker were seen in the vicinity.

In the more open habitats, the finch family was represented by the Chaffinch, Goldfinches feeding, Greenfinch, Redpoll, and Linnet. The only bunting recorded was the Yellowhammer, with the males still uttering their characteristic song. Five warbler species were recorded and of these the most interesting was the Lesser Whitethroat. A single male of this species was first heard and then seen in a garden with dense foliage next to the railway line. Both Sparrowhawk and Kestrel were seen hunting in the area. Rooks, Carrion Crows and Magpies were well represented.

MAMMALS AND LOWER VERTEBRATES (M. J. A. Thompson)

The Harrogate Natural History Society has recorded over 20 species of mammal in the vicinity; this total includes 7 species of bat in the Nidd Valley. However, this meeting has to report little mammalian activity, with only field signs of Mole, Rabbit and Red Fox. Inspection of the viaduct proved to be negative as regards evidence of the presence of bats, but it is a suitable roost site for such species as Daubenton's Bat.

The Common Frog was reported from the area.

MOLLUSCA (A. Norris)

The dense woodland canopy, in conjunction with the acidity of the basic underlying rocks at Bilton Banks, proved to be too hard an environment for many of our native mollusca. The best woodland habitats for these animals are usually more open, thus allowing a rich undergrowth of herbage to become established. The list of species found in the woodland reserve was therefore very limited, even in comparison with Scotton Banks which lie less than a mile downstream. The woodland at Bilton Banks produced 20 species on the day of our visit; Scotton Banks, which had been investigated on 8 April 1989 produced exactly twice this figure. The woodland at Scotton Banks, as well as being more open, lies partially on the Magnesian Limestone which renders it a far more favourable molluscan habitat.

ENTOMOLOGY (W. A. Ely)

The disused railway line running north from Bilton Lane had become overgrown with trees and shrubs as well as lower-growing plants, providing a variety of habitats for insects to exploit. The capsid bug *Phylus pallipes* and the froghoppers *Kybos strigilifer*, *Edwardsiana rosae* and *E. prunicola* were found on the bushes, as well as the uncommon lacewing *Symppherobius elegans*. Among the carnivorous empid flies were the tiny *Platypalpus cothurnatus*, *P. pallipes* and *P. verralli* and the somewhat larger *Hilara cornicula*. Damp areas held a fair selection of the more common doly flies, most of which are metallic green although *Xanthochlorus ornatus* is mainly yellow. The scutterfly *Diplonevra pilosella* was taken here, together with several hoverflies. The picture-wing flies included *Paroxyyna absinthi* whose larvae feed on Mugwort and Wormwood, *Tephritis vespertina* which breeds in seed-heads and *Seioptera vibrans* which is glossy black with a dark leading edge to each

wing. The uncommon fly *Homoneura consorbrina* is yellow and its larvae feed on decaying plant material, and there were several of the dung-breeding sepsids, which resemble miniature versions of *Seioptera*. The shorefly *Discocerina obscurella* was also found, as was the ichneumon *Acrotomus lucidulus* and the parasitic cynipid *Trybliographa diaphana*, both of which are new to VC64. The most interesting insect collected on this track was the ichneumon *Sinarachna nigricornis*, which belongs to a group of kamikaze ichneumons which parasitise immature spiders. This species attacks web-spinners and eventually kills its host. It is a scarce though widespread insect in this country, and this is the first time it has been recorded in Yorkshire.

Bilton Beck Wood was rather dark and dense and the greatest variety of insect life as, as usual, found around the edges. Mr Savage found the large mayfly *Ephemera danica* near the river. The colony of Fern Bug included macropterous as well as the usual brachypterus specimens and other bugs included *Phylus coryli* and *Psallus wagneri* and the Forest Bug. Among the froghoppers were *Eupteryx cyclops* and *Typhlocyba bifasciata*. Flies were fairly plentiful and included the yellow cranefly *Limonia trivittata* and the empids *Platypalpus cothurnatus*, *Hilara fuscipes*, *Chelipoda vocatoria* and *Trichopeza longicornis*. The latter has exceptionally long antennae and was fairly frequent in the wood. The dories here included *Hercostomus celer*, the large and impressive *Peocilobothrus nobilitatus* with white and smoky wing markings, the silver *Argyra leucocephala* and the tiny *Teucophorus signatus*, in which the males have the hind tibiae ornamented with a pencil of hairs. The marsh flies, which have snail-killing larvae, were represented by four species, including the uncommon *Pteromicra angustipennis*, and the shoreflies included *Philygra flavipes*. The flowers along the wood edge held a number of ichneumons, including *Cosmoconus elongator*, *Tryphon auricularis* and *Pygmaeolus nitidus*. The latter is a tiny insect which I added to the Yorkshire list two days earlier at Pot Riding Wood in Doncaster, so this specimen was the second for Yorkshire and the first for VC64.

COLEOPTERA (M. L. Denton)

From a coleopterist's point of view the day's meagre findings were somewhat disappointing. The Woodland Trust reserve, although extensively covered, revealed only a handful of species. With the exceptions of *Quedius plagiatus* and *Bythinus curtisi*, which were found under bark, and *Gyrophaena gentilis* in decaying fungi, the large proportion of species emanated from a pile of Fox scats. As can be expected from this medium rove beetles predominated. The occurrence of *Atheta pertyi* and *A. dubia*, although both are widely distributed in Yorkshire, constituted only the third records for the vice-county.

Most of the beetle species encountered along the disused railway line came from a couple of piles of decaying grass cuttings, dumped from nearby houses. Again a good selection of rove beetles was present, but all were common and do not call for comment, although *Atheta dubia* did put in another appearance. The small ponds along this length of disused railway held only a selection of the commoner water beetles. Full species lists have been lodged with the Woodland Trust and Harrogate Naturalists' Society.

LEPIDOPTERA (W. A. Ely & G. Boyd)

Only 5 species of butterfly were noted during this meeting and macro-moths were also scarce. Micro-moths were more in evidence, both as adults and as leafmines, particularly on the trees and shrubs along the railway track and in the wood. The Green Tortrix was frequent on the sheltered side of the wood and other micros included *Isotrias rectifasciana* and *Elachista triatornea*.

OTHER ARTHROPODS (P. Lee & D. T. Richardson)

The dense, acidic woodland of the Woodland Trust reserve around Bilton Beck was a poor habitat for the groups covered under this heading, with records for only four woodlice, three centipedes, seven millipedes and two harvestmen. Even some of the commonest species were apparently absent. Bilton Beck was home to two species of leech – *Erpobdella octulata* and *Glossiphonia complanata* – indicating a degree of pollution, possibly from the farm upstream. The only record of note from the woodland was of the harvestman *Opilio parietinus*, new to the 10 km square.

The dismantled railway proved to be a slightly richer habitat, adding a further three species of harvestmen and two species each of woodlice, centipedes and millipede to the lists. This was probably due to the variety of habitats along its length, including calcareous areas where the pill woodlouse *Armadillidium vulgare* was abundant. The area around the car park appeared the richest in terms of species diversity, providing new 10 km square records for the centipede *Geophilus insculptus* and the millipede *Boreoiulus tenuis*. The latter, a tiny white creature with orange yellow spots along its length was the most interesting find of the day. It appears to be relatively uncommon in the county, having been recorded from less than twenty sites. Many of these records are from gardens or waste ground and its presence at this site can probably be attributed to the dumping of garden rubbish.

LICHENOLOGY (A. Henderson)

Close by the entry to the disused railway an old wall by the trackside carried a colourful calcicolous community, dominated in the heavy rain falling just then by the dull red swollen fruits of *Protoblastenia rupesris* among an overall sprinkling of bright white *Lecanora albescens* and yellow *Caloplaca citrina*. A little further along the track these last two species were growing with *Lecanora dispersa* on an old iron connecting-plate lying on the ground among brick, mortar, stone and other rubble colonised by typical ruderal species. Here, too, an old iron railing stub was shared by *Scoliciosporum umbrinum* and *Trapelia coarctata*, the former spreading onto the surrounding lead packing. The gravelled bituminous felt of a flat garage-roof standing just below the rail-track had a well developed population of *Physcia caesia*, *Phaeophyscia orbicularis* and *Lecanora muralis* overgrowing numerous crustose species.

The high sandstone viaduct over the Nidd had an attractive flora, including *Catillaria chalybeia*, *Lecanora stenotropa* and *Lecidea subfusca*, diversified by calcicoles of the mortar-filling.

A very brief walk into the woodland confirmed the impression of a survey visit there three years earlier, of a lichen flora patchy but nonetheless promising in parts.

MYCOLOGY (C. S. V. Yeates)

The main body of the woodland examined was rather disappointing from a mycological point of view. At this time of year the mycologist is obliged to concentrate almost entirely on the micro-fungi. This involves the painstaking examination of both living and dead plant material, an activity which on some days can furnish ample material for the day from the first couple of hundred metres walked and on others may yield little that is unusual or – which is worse – promising collections which upon examination are found to be effete or lacking the features necessary for identification. The latter was the case on this occasion.

Good material of the discomycete *Pyrenopeziza petriolaris* was collected on *Acer pseudoplatanus* petioles, and *Melica uniflora* provided a new host record in Yorkshire for the 'loculoscomycete' *Leptosphaeria herpotrichoides*. Another grass, *Festuca gigantea*, yielded the hyphomycete *Cylindrotrichum ellisi*, previously only known in the county on *Deschampsia cespitosa* in VC63.

Among plant parasites, there was good material of the rust *Puccinia pimpinellae* on *Pimpinella major* along the disused railway line, and the hyphomycete *Ramularia taraxaci* on *Taraxacum* by Milner Lane was new to Yorkshire (although the second county record was not short in coming, it being recorded the following day in the Rotherham area!).

Condenser Wood and Preston Quarry (VC65) 7 May (D. Millward)

MOLLUSCA (A. Norris)

The two areas examined produced a total of forty species of land and freshwater mollusca, none of which proved new to the 10 km square. Several species found, however, are worthy of special mention as they have restricted distributions within the county. It is always of interest to record even local extensions to the known ranges of species such as *Helicogona lapicida* (L., 1758), or *Helicella itala* (L., 1758), both recorded from Preston Quarry, particularly as the latter is thought to be declining throughout Britain as a result of habitat loss. Other species of interest included *Azeca goodalli* (Esmark, 1886), *Oxychilus helveticus* (Blum, 1881) and *Ashfordia granulata* (Alder, 1830).

ENTOMOLOGY (W. A. Ely)

The quarry and adjacent woodland where we began the day's work had plenty of insects. The stream was obviously clean as eight species of stonefly were found, including some less common species such as *Nemoura cambrica* and *N. erratica*. The Green Tiger Beetle was in evidence, flying in the warm sunlight when approached too closely. A single dead specimen of the pill beetle *Simplicaria semistriata* was found, plus live examples of the leaf beetle *Phyllotreta tetrastigma*, with four pale marks on the elytra, the tiny weevil *Apion pallipes* and the slightly larger *Ceuthorhynchus alliariae*. A good range of the lesser dung flies, whose larvae play an important part in the decomposition of dead and decaying material, were collected, but the most interesting fly from this area was the picture-wing fly *Platarea discoidea*. This nationally rare insect seems to have its British headquarters in this vice-county, where it is found in streamside woodland where its larvae are stem-borers of the large bell-flowers. The sawflies included *Birkia cinereipes*, *Empria liturata* and *E. tridens*, and the parasitic Proctotrupoidea were represented by *Zygota excisipes*, in which the fore tibiae of the males are expanded into broad lamellar extensions.

The derelict pond and carr at Tullis Cote added one more stonefly, the meniscus midge *Dixella martinii* whose larvae are u-shaped and live, as their name suggests, in the surface film, the slender empid *Rhamphomyia umbripennis* and yet more lesser dung flies, while *Empria alector* was added to the sawflies.

At Gillfield Wood the eight species of stoneflies included two additions to the list. The beetles included the lesser dung beetle *Cercyon lateralis*, the hister *Onthophilus striatus* and the carrión beetle *Catops coracinus*. The tiny rove beetles included *Atheta sordidula* and *A. nigripes* and the common pollen beetle was joined by the less common *Meligethes pedicularius*. The picture-wing fly *Tephritis conura* and the fungus-breeding *Suillia parva* were found, and the seven species of lesser dung flies included *Opalimosina liliputana*. The piles of dry quarry waste proved interesting for ground-nesting bees and the ones found here included *Andrena ruficrus* and *Sphecodes hyalinatus*, a kleptoparasite which lays its eggs in the nests of *Andrena* species.

MYCOLOGY (C. S. V. Yeates)

Extremely dry conditions meant that there was a distinct scarcity of fungi. Nevertheless, there were several interesting finds, the best being the agaric *Melanotus hepaticolor*, new to the

county, found by Mr Norris and identified by Dr Cooper. A note about this find and that of a related species has already appeared in this journal (Cooper 1990). A pile of rotting turnips provided another good find in the shape of the discomycete *Cheilymenia rubra*; this is the third Yorkshire record (and the first for the vice-county) of a species most commonly reported from spent hops.

In the nearby village of Preston-under-Scar the downy mildew *Peronospora viciae* was found in considerable quantity on a patch of *Vicia sativa* ssp. *nigra*. This is another first vice-county record and is also a new host record for Yorkshire.

REFERENCE

- Cooper, J. (1990) Two species of *Melanotus* – Agaricales new to Yorkshire. *Naturalist* **115**: 21–22.

BOOK REVIEWS

Fungi: Delight of Curiosity by Harold J. Brodie. Pp. xii + 130, including 21 black and white plates. University of Toronto Press. 1989. £7.95.

This is the paperback edition of a book which first appeared in 1978. Its avowed intention is to present to a general readership an indication of the fascination and beauty of the fungal world. It is not a textbook, but there are many detailed descriptive sections, for example within the chapter entitled *The Mushroom: A Study in Form and Function*, where details of the morphology and physiology of a typical agaric are described.

Despite the titles of some of the chapters – *The Mystery of The Water-Guns*, *The Insect Itch* and so on – the book is relatively free of excessive whimsy, though the author at times adopts a rather dated style; it could perhaps be argued that this is part of its charm. It is a great pity that the opportunity to update – or at least improve – the reproduction technique of the 22 photographs was not taken. Many excellent photographs can be seen in modern books and journals, and given the intent of this current work the photographs do little to convey the diverse variety of form and colour to be found in fungi – at both the macroscopic and microscopic levels.

While the book does not claim to be a taxonomic work it is still unfortunate to find the occasional fundamental error. For example, in the chapter on *The Ants' Fungus Gardens* the author discusses attempts to determine the identity of the fungi concerned. One turned out to be a *Lepiota*, another a *Leucocoprinus* which the author states is related to the ‘Inky Cap Mushroom’; this is simply not so, despite its name *Leucocoprinus* belongs in the Agaricaceae, and is in fact rather closely related to *Lepiota*.

These criticisms aside, there is much to commend the book. Whatever our discipline, in our quest for the rarity or the critical identification we all too easily lose sight of the aesthetic element of our study. Through his obvious enthusiasm the author sets out to correct this. From a mycological point of view it is good to see that most fungal groups are included and that despite an understandable bias towards the basidiomycetes the book is not top-heavy with toadstools. Particularly praiseworthy is the chapter on the neglected Laboulbeniales; at eight and a half pages this is far longer an account than is to be found in standard mycological textbooks. That said, the virtual absence of any further mention of the huge class Ascomycotina in this book is something of an anomaly, as the Laboulbeniales are scarcely representative of it.

Goose Damage and Management Workshop. Proceedings of a meeting organised by The Wildfowl & Wetlands Trust at Martin Mere, Lancashire, on 27 April 1990. Edited by Myrfin Owen and M. W. Pienkowski. Pp. 86, including numerous figures and tables. Joint Nature Conservation Committee, Peterborough. 1991. £5.00, paperback.

No. 33 in the NCC 'Research & survey in nature conservation' series is an account of a meeting which brought together various representatives from agricultural and conservation interests. Some species of goose, while scarce in world terms, descend on these islands each winter in locally large numbers and certainly cause serious damage in places. Such a problem can only be solved by all interests working together to manage the countryside for these geese and not, as one participant said, introducing himself as 'an Essex farmer and Brent Goose keeper', getting at one another's throats. Required reading for all lovers of wild geese.

BSP

New Views on an Old Planet by Tjeerd H. van Andel. Pp. xii + 324, with numerous b/w sections, maps and illustrations. Cambridge University Press, 1985. Paperback edition 1991. £14.95.

Over the last 30 years there have been dramatic developments in the techniques which can be used by geologists to reconstruct ancient environments from clues which are contained within rock deposits and in understanding how sections of the earth's crust have moved relative to one another throughout the last 250 million years. These two strands of understanding are ably elucidated by Professor van Andel who capably conveys complex issues by means of well chosen analogies, word pictures and simple graphical illustrations.

With four and a half billion years of earth history to cover, the book wisely focuses on selected key themes. Two short introductory chapters present basic concepts of rock dating and outline how some ancient environments may be reconstructed from geological evidence. Climatic change during Ice Ages are covered in the next three chapters, leading naturally onto a further four chapters on the relationship between changing climates and continental drift. There is a marked emphasis on the historical evolution of the world's oceans. A further three chapters deal with the early development of the atmosphere and oceans, and finally four chapters are devoted to the history of life on earth with emphasis on the rate and mechanisms of evolution and speculation on the cause of mass extinctions.

Overall, the book provides an excellent, eminently readable introduction to recent ideas concerning the earth's history, and is particularly suited to the general reader because of its clear non-technical style.

DEC

CONTRIBUTORS

- Andrews, M. 40, 113–123
 Archer, M. E. 39, 112
 Armitage, J. S. 133–134
 Atherden, M. A. 143–144
- Beaumont, H. E. 124
 Blockeel, T. L. 143
 Boyd, G. 150
 Bramley, D. 134
 Bramley, D. M. 134
 Brightman, F. H. 16
 Brocklehurst, S. 135
- Chicken, E. 140–141, 142–143
 Clunas, A. J. 73–91
 Colloff, M. J. 21–25
 Cotton, D. E. 25–26, 40, 154–155
 Crackles, F. E. 136
 Crossley, R. 66
- Davies, B. E. 71–72
 Delany, M. J. 38, 59–60, 112
 Denton, M. L. 36–37, 142, 145, 148, 150
 Dinnin, M. H. 57–59
 Disney, R. H. L. 93–94
 Duncan, J. E. 35–36, 136–141
- Ely, W. A. 39–40, 141–153
 Ezard, A. S. 142
- Farrar, D. R. 41–43
 Flint, J. H. 44
- Grant, D. R. 136–137, 146
- Hale, W. H. G. 72, 98
 Hambler, C. 111
 Headley, A. D. 30, 41–43, 43–44
 Henderson, A. 17–20, 151
 Higginbottom, T. 147–148
 Howes, C. A. 27–30, 38, 99–101
- Johnson, P. N. 66
- Kirk, B. R. 27–30, 31–33
 Kirk-Spriggs, A. H. 107–111
 Knight, J. E. 16, 34, 38, 106–107
- Lee, P. 145–146, 148, 151
 Limbert, M. 3–15
- Magee, L. 139–140
 Marsh, R. J. 101–106
 Mather, J. R. 66, 92
 Medd, T. F. 136
- Newbould, J. A. 142
 Norris, A. 65, 144–145, 149, 152
- Pashby, B. S. 141, 154
 Payne, J. 145
 Pearson, J. A. 147
 Pentecost, A. 125–131
- Richards, J. P. 33–34
 Richardson, D. T. 40, 151
 Rumsey, F. J. 41–43
- Sanderson, M. R. 67–68
 Seaby, R. M. H. 61–64
 Seaward, M. R. D. 17–20
 Seyd, E. L. 21–25
 Sheffield, E. 41–43
- Shorrock, B. 73–91
 Skidmore, P. 69–71, 72
 Spelling, S. M. 61–64
 Sutton, S. L. 44, 60
- Thayre, M. E. 39
 Thompson, M. J. A. 144, 149
- Vaughan, M. 45–56
 Vaughan, R. 45–56
- Wallis, A. J. 141
 Weeks, R. W. 133–134
 Wilson, J. 95–98
 Yeates, C. S. V. 132, 141–153
 Young, J. O. 61–64

INDEX

Acarı

Moss mites of the Lake District, 21–25

Biography

William Casson of Thorne, 3–15

Book Reviews

15–16, 25–26, 30, 38–40, 43–44, 59–60, 71–72, 98, 111–112, 124, 132, 134, 153–155

Botany

William Casson of Thorne, 3–15; Botanical report for 1990, 136–141

Cetacea

Recent Cetacean records from Yorkshire waters, 99–101

Coleoptera

Subfossil occurrence of the Greater Silver Water-beetle at Shirley Pool 57–59; Further Yorkshire locality for the Water Fern Beetle, 66; Coleoptera records for Yorkshire, 101–106; The G.B. Walsh Collection of *Meligethes*, with notes on published records, 107–111

Diptera

Phaonis jaroschewskii, the ‘Hairy Canary’, 69–71; Two rare scuttle flies from Yorkshire, including one new for Britain, 93–94

Fish

Smelt in the Humber and Tees estuaries, their tidal tributaries and the tidal waters of Lincolnshire, 27–30; Historical records of the Burbot in the River Hull, 31–33

Freshwater Ecology

Macro-invertebrate fauna of Spicey Gill, Ilkley Moor, 113–123; Vegetation of some English crans, 125–131

Hirudinea

Duck Leech in Crose Mere, Shropshire, 61–64

Invertebrates

Macro-invertebrate fauna of Spicey Gill, Ilkley Moor, 113–123

Lepidoptera

Population changes in three butterfly species in North Lancashire 1979 to 1990, 95–98

Lichenology

Lichen flora of the West Yorkshire conurbation, 17–20

Mammals

Recent Cetacean records from Yorkshire waters, 99–101; Roe Deer, 106–107; Natterer’s Bat taken by Short-eared Owl, 133–134

Mollusca

Helicodiscus singleyanus new to Yorkshire 65

Myriapoda

A new millipede for Yorkshire, 33–34

Obituaries

Joan Appleyard, 35–36; Edward Wrigley Aubrook, 36–37; Alan Frederick Gordon Walker, 67–68

Ornithology

Dotterel, 34; Birds in Farndale in 1990, 45–56; Cache prey of Tawny Owl, 66; Birds around Malham Tarn, 73–91; Corrections to *The Birds of Yorkshire*, 92; Successful breeding attempt by an immature female Peregrine Falcon in the Yorkshire Dales, 135

Pteridophyta

Killarney Fern in Yorkshire, 41–43

Subfossils

Subfossil occurrence of the Greater Silver Water-beetle at Shirley Pool, 57–59

Yorkshire Naturalists’ Union

Excursions in 1989, 141–153

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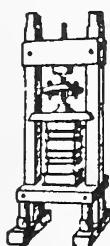
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The Naturalist

A QUARTERLY JOURNAL OF NATURAL HISTORY FOR THE NORTH OF ENGLAND

1000th ISSUE

A common bird census on Thorne Moors National Nature Reserve — Peter C. Roworth

Aculeate wasps and bees of Skipwith Common and a comparison of Skipwith Common with Allerthorpe and Strensall Commons — Michael E. Archer

***Drosophila fenestrarum* from Leeds, a new record for northern England** — Andrew J. Davis and Linda S. Jenkinson

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Readers of *The Naturalist* will have noticed that the number of photographic illustrations has increased in recent years. Good clear photographs, suitably captioned, to accompany articles or as independent features, such as the bird portraits by Arthur Gilpin in recent issues, are always welcome.

To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record his deep appreciation of this imaginative gesture.

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Editor M. R. D. Seaward, MSc, PhD, DSc, FLS
The University, Bradford BD7 1DP

Volume 117

1992

Published by the Yorkshire Naturalists' Union

EDITORIAL

The Yorkshire Naturalists' Union has good reason to be proud of its record, not only as one of Britain's oldest major natural history societies, but also in being responsible for the continuous publication of a nationally, and indeed internationally, respected scientific journal over 117 years. First issued in August 1875, it appeared monthly with no interruptions until April 1942, when it became a quarterly journal. Although it has primarily served the interests of Yorkshire's natural historians, both amateur and professional, it has nevertheless catered throughout its long history for the north of England as a whole and on occasion for other parts of the British Isles in a wide range of disciplines within the natural sciences. With one thousand issues to its credit, it is surely remarkable that *The Naturalist* has had only ten Editors:

Editor(s)	Dates	Issues
C. P. Hobkirk & G. T. Porritt	1875 – 1884	1 – 108 (108)
W. Denison Roebuck & W. Eagle Clarke	1884 – 1888	109 – 161 (53)
W. Denison Roebuck	1889 – 1902	162 – 329 (168)
T. Sheppard & T. W. Woodhead	1903 – 1932	330 – 689 (360)
W. H. Pearsall & W. R. Grist	1933 – 1942	690 – 803 (114)
W. R. Grist & W. A. Sledge	1943 – 1947	804 – 823 (20)
W. A. Sledge	1948 – 1974	824 – 931 (108)
W. A. Sledge & M. R. D. Seaward	1975	932 – 935 (4)
M. R. D. Seaward	1976 onwards	936 – 1000 (65)

This 1000th issue is a milestone in the history of the Yorkshire Naturalists' Union – long may both our society and its journal continue to flourish!

A COMMON BIRD CENSUS ON THORNE MOORS NATIONAL NATURE RESERVE, SOUTH YORKSHIRE – A RELIC CUT-OVER RAISED MIRE

PETER C. ROWORTH

Site Manager, Thorne Moors NNR, English Nature, 44 Bond Street, Wakefield, West Yorkshire

SUMMARY

A common bird census was undertaken on Thorne Moors National Nature Reserve in South Yorkshire, part of an extensive complex of cut-over raised mire and associated habitats extending into South Humberside. Six visits were made to the reserve, each lasting approximately five hours and recording was carried out using the standard method of the British Trust for Ornithology Common Bird Census. A total of 16 species was recorded breeding: an overall bird density of 93 prs/km². Although this density is low compared to other habitats, the survey has shown the value of the mosaic of habitat found on abandoned relic cut-over raised mires. Nationally over 96% of lowland raised mires in Britain have been lost due to drainage or peat cutting since the 1850s. Thorne Moors NNR represents the best surviving example of a cut-over raised mire left on Thorne, Goole, Rawcliffe and Crowle Moors, the largest remaining area of lowland peatland in Britain and a site from which peat is still commercially extracted.

INTRODUCTION

Knowledge of the breeding bird populations of intact and cut-over raised mires in Britain is poor, being restricted to only a broad overview of species distribution (Stroud 1989). Although ten raised mire sites were documented in the BT-habitats register (Fuller 1982), which gave an indication of species found breeding on the mire surface and associated edge habitats, few raised mires have been the subject of more detailed ornithological study. Williamson (1968) recorded the distribution of breeding bird territories at Tarn Moss, near Malham, North Yorkshire and the birds of Mongan Bog, Co. Offaly were surveyed by Madden (1987). Kavanagh (1990), as part of a baseline ecological survey of Turraun Cutaway Bog, Co. Offaly, investigated bird species abundance and diversity as indicators of habitat quality. However, most ornithological studies of peatlands in Britain have concentrated on upland blanket bogs (eg Stroud *et al* 1987, Rothwell *et al* 1988, Stroud *et al* 1988).

Raised mires generally occur in Britain on estuarine alluvial deposits and on the flood plains of mature river systems. The original fen vegetation gradually developed into a plant community which favoured the growth of *Sphagnum*, cotton grass and heathers which became independent of any groundwater influence and relied totally on rainfall. There is also an upward growth of vegetation resulting in the characteristic shallow dome shape of these mires which can still be seen today at sites such as Flanders Moss, Tayside and Glasson Moss, Cumbria. Once the water table in these structures becomes elevated above the original groundwater level, then they are called raised bogs or mires (Meade 1988). The surfaces of intact raised mires vary considerably, but usually there is a mosaic of *Sphagna* hummocks, open pools and a mixture of associated flora including *Drosera rotundifolia*, *Andromeda polifolia*, *Vaccinium oxycoccus* and *Erica tetralix*. The slope of the mire, called the rand, is usually drier and contains the dwarf shrub communities, for example, *Calluna vulgaris* and *Myrica gale*. On the extremities, the lagg is usually identified by a marginal water course and is represented by an association of poor fen or *Betula-Salix* communities.

The activity of man greatly affects the surface vegetation of raised mires. Large areas have been reclaimed for agriculture by drainage and cultivation; lowering of the consequent water-table results in the remnants of true mire communities becoming enveloped by flora usually associated with the lower slopes of the rand at the expense of

Sphagnum, and the lagg tends to become ill-defined. More directly, peat-winning on sites has a drastic effect upon the surface vegetation. The sequence of vegetation from the central wet dome to the lagg is lost, and through the lowering of the water-table, the cut-over surface becomes dominated by *Betula pubescens*, *B. pendula*, *Pteridium aquilinum*, Heather and poor fen communities. Pockets of *Sphagnum* associated vegetation become rare (Ratcliffe 1977).

Thorne Moor, (South Yorkshire) and the contiguous Goole, Rawcliffe and Crowle Moors (South Humberside) cover an area of 1,918 ha; they represent an extensive remnant of a raised mire system at the edge of the flood plain of the Humberhead levels. The area surrounding the Moors has been drained and claimed for agricultural use, and the main peatland continues to be extensively disturbed through further drainage and peat winning. To the north of the reserve commercial peat extraction still takes place. Vegetation is removed over large tracts of the Moors. The peat is then taken at a depth of a few centimetres by a process known as milling, which is often repeated several times during dry weather. Milling also produces a flat, dry surface, lacking the baulks and bottoms that had been an earlier feature of the peat industry and which can still be seen south of the reserve. However, despite its long history of exploitation, this area presents the largest surviving example of lowland peatland in Britain (Limbert *et al* 1986, Limbert 1987). Thorne, Goole, Rawcliffe and Crowle Moors were collectively designated a Site of Special Scientific Interest by the Nature Conservancy Council, under Section 28 of the Wildlife and Countryside Act (1981) in 1986.

This paper reports on the breeding bird fauna of the NNR and examines its relationship to the habitats presently found there.

THE STUDY AREA

Thorne Moors NNR covers 73 ha within the Thorne, Goole, Rawcliffe and Crowle Moors (Figure 1) and contains the best example of a relic cut-over raised mire left on the moors (Roworth 1991). Peat was initially cut from the area in 1894 by the Griendtsveen Moss Litter Co., using Dutch methods. In 1896 Griendtsveen was succeeded by the British Moss Litter Co., who continued to work until c. 1922, when this area was abandoned. Internal canals were cut to transport the peat by barge from this area to a peat mill on the western edge of the moors. On the NNR part of the system of derelict canals and cuttings is still clearly visible and the pattern of vegetation which has developed gives a mosaic of habitat ranging from re-established mire communities, to dry heath and poor fen (Figure 2). The mire communities are dominated by *Eriophorum angustifolium* and *E. vaginatum*, with areas of *Sphagnum* hummocks and hollows. Associated species include Bog-rosemary, Cranberry, Round-leaved Sundew and Cross-leaved Heath. The old mire surface between the peat cuttings is drier and has Downy Birch, Bracken and Heather. The re-vegetated canals contain a wide range of plant species which include remnant mire flora, but also those associated with fenland habitats. These latter species include *Phragmites australis*, *Cladium mariscus*, *Potentilla palustris* and *Salix spp.* Along the northern boundary of the reserve bordering the main canal, a limestone clinker towpath was laid to allow horses to pull the peat laden barges and a disused tramway exists on the eastern boundary. These areas have developed their own assemblage of calcicolous species, including *Listera ovata* and *Dactylorhiza praetermissa*. With such a wide range of habitats, the reserve is particularly rich in invertebrates. Eleven species of dragonfly and 20 species of butterfly have been recorded. The Large Heath butterfly *Coenonympha tullia* breeds on the reserve, and here it is at its southerly limit in eastern England. The areas occupied by these habitats on the NNR are:

Peat cuttings – mire surface 35 ha

Peat baulks – dry heath 30.5 ha

Vegetated canals and drains with open water – fen 4.5 ha

Limestone towpath and tramway – Calcareous grassland 3.0 ha

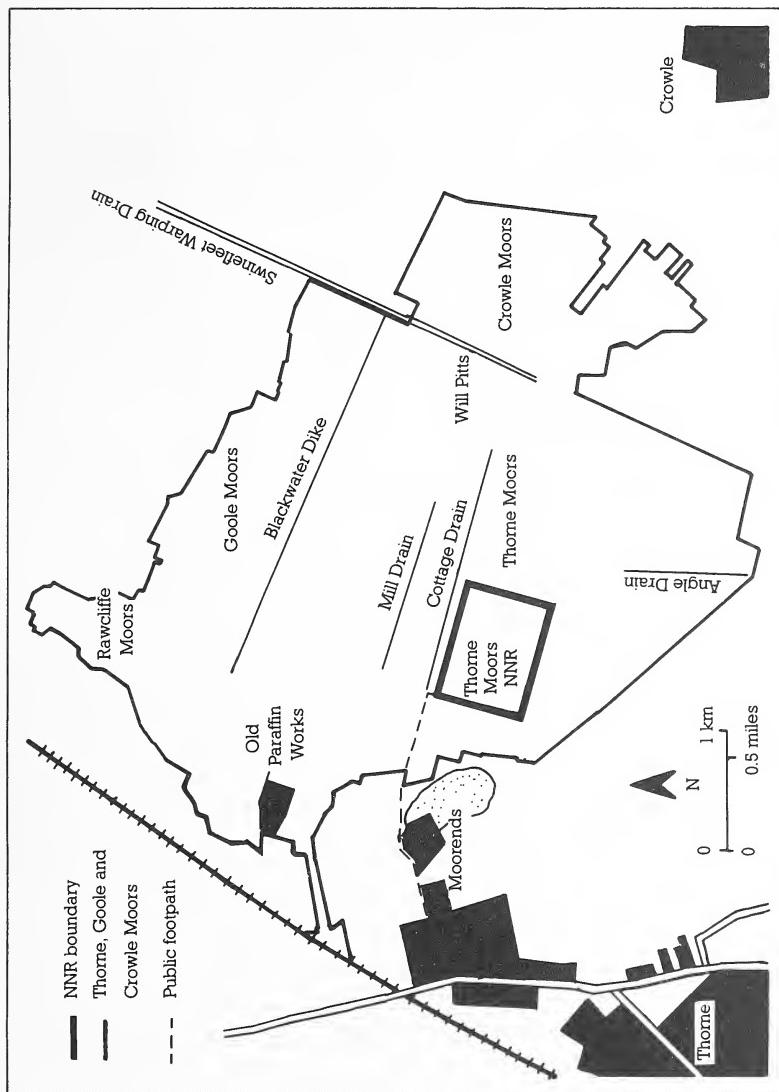


FIGURE 1
Location of Thorne Moors NNR on Thorne, Goole, Rawcliffe and Crowle Moors.

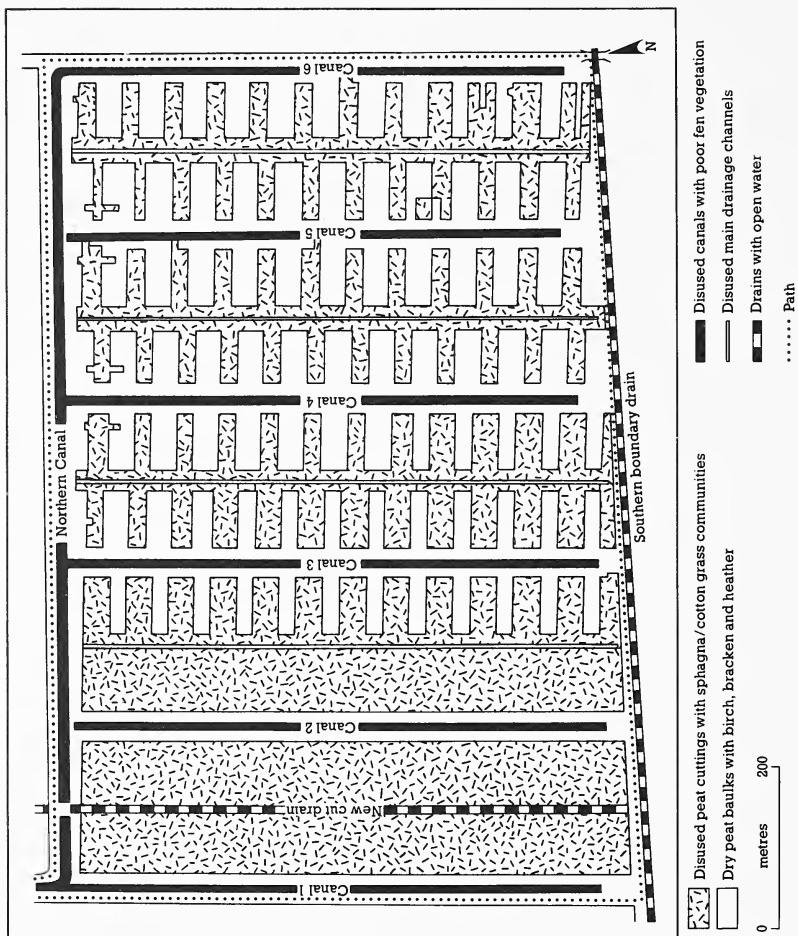


FIGURE 2
Thorne Moors NNR showing main habitats.

METHOD

Observations of the bird life were made along a defined route. Bird contacts were recorded on to a visit map using the species and activity codes as specified in the BTO Common Bird Census (CBC) instructions (Marchant 1983). Six visits were made at 10-day intervals between 11 April 1990 - 13 June 1990, each lasting approximately five hours. The route followed a dry baulk alongside each of six canals, which gave a good coverage of the whole site.

After the field visits, all the data was transferred on to species maps. These were then analysed to give numbers of breeding birds for the site using CBC guidelines as to identification of territories (Marchant 1983).

RESULTS

Sixteen species were recorded breeding on the reserve: an overall density of 68 pairs in 73 ha (93 pairs/km²) (Table 1). Fuller (1982) assumed that generally the number of species nesting on an unmodified raised mire would be greater on the margins, where there is a wider variety of vegetation on the lower slope of the rand and the surrounding lagg. Where the original mire surface has been influenced by man's activities the vegetation types will become altered and diversified, tending to form a mosaic of mire, dry heath and fen. Thus, it is reasonable to assume that the number of breeding bird species will increase through this range of habitat. Usually, those few species which breed on the mire surface will be spread amongst this influx of additional species, if pockets of suitable habitat remain for them. The distribution of breeding birds at Thorne Moors National Nature Reserve shows this pattern.

From the 16 species recorded, Snipe *Gallinago gallinago*, and Meadow Pipit *Anthus pratensis* bred on the developing mire surface in the peat cuttings. These birds are characteristic of lowland mires, (Fox 1986), but Teal *Anas crecca* which also bred, is generally regarded as an upland mire breeding bird, although occurring on some other lowland raised mires.

The drier peat baulks, which depict a vegetation type similar to that of the lower rand slopes and dry heath communities, attracted Woodpigeon *Columba palumbus*, Wren *Troglodytes troglodytes*, Willow Warbler *Phylloscopus trochilus* and Yellowhammer *Emberiza citrinella*. Tree Pipit *Anthus trivialis* and Whinchat *Saxicola rubetra* bred amongst low vegetation of the peat baulks, but obtained food (invertebrates) over the mire surface of the peat cuttings. They also relied on prominent dead birch stumps for suitable song posts.

Nightjars *Caprimulgus europaeus* are usually associated with woodland edge habitats especially those growing on heathland (Burgess *et al* 1989). The Moors are an important stronghold for the species and hold almost 2% of the British breeding nightjar population. One pair found a suitable area to breed on the reserve.

Where a fen community has developed, generally in the old canals, birds such as Robin *Erithacus rubecula*, Reed Warbler *Acrocephalus scirpaceus*, Whitethroat *Sylvia communis*, Willow Tit *Parus montanus* and Reed Bunting *Emberiza schoeniclus* all held territories.

Several pairs of Cuckoo *Cuculus canorus* were observed over the area calling and displaying in search of suitable hosts.

During the survey, 18 species of non-breeding birds were also observed, as shown in Table 2. Sparrowhawk *Accipiter nisus* and Kestrel *Falco tinnunculus* which bred close to the NNR were frequently observed hunting over the area. Hobby *Falco subbuteo* was occasionally recorded around midday, particularly during May, hawking over the site. Jay *Garrulus glandarius*, Magpie *Pica pica* and Carrion Crow *Corvus corone* were all observed, particularly early in the breeding season, flying over in search of eggs or nestlings. A Green Woodpecker *Picus viridis* was occasionally observed, in search of food on decaying birch stumps, and hirundines regularly fed over the area. Other sightings of birds were generally incidental to the site.

TABLE 1
 Birds recorded breeding between 11 April and 13 June 1990 on Thorne Moors
 National Nature Reserve. Data shown as breeding pairs and prs/km²

Species	mire (old peat cuttings)	dry heath (peat baulks)	fen (abandoned canals)
Teal <i>Anas crecca</i>	2 – 2.7		—
Snipe <i>Gallinago gallinago</i>	2 – 2.7		—
Meadow Pipit <i>Anthus pratensis</i>	4 – 5.4		—
Wood Pigeon <i>Columba palumbus</i>	—	2 – 2.7	—
Nightjar <i>Caprimulgus europaeus</i>	—	1 – 1.3	—
Tree Pipit <i>Anthus trivialis</i>	—	4 – 5.4	—
Wren <i>Troglodytes troglodytes</i>	—	7 – 9.5	—
Whinchat <i>Saxicola rubetra</i>	—	10 – 13.6	—
Willow Warbler <i>Phylloscopus trochilus</i>	—	10 – 13.6	—
Yellowhammer <i>Emberiza citrinella</i>	—	3 – 4.1	—
Robin <i>Erythacus rubecula</i>	—	—	5 – 6.8
Reed Warbler <i>Acrocephalus scirpaceus</i>	—	—	1 – 1.3
Whitethroat <i>Sylvia communis</i>	—	—	6 – 8.2
Willow Tit <i>Parus montanus</i>	—	—	1 – 1.3
Reed Bunting <i>Emberiza schoeniclus</i>	—	—	1 – 13.6
Cuckoo <i>Cuculus canorus</i> – 3 pairs			
4.1 prs/km ² were recorded for the site			

DISCUSSION

Of the few British and Irish mire sites which have been studied ornithologically, results have shown that numbers of breeding birds vary considerably, influenced by many factors including latitude and mire type (Tables 3 and 4). The bird communities in the Malham Tarn region studied by Williamson (1968), included those of Tarn Moss, an intact raised

TABLE 2

Non-breeding birds observed between 11 April and 13 June 1990 on Thorne Moors National Nature Reserve

Species	Notes
Sparrowhawk <i>Accipiter nisus</i>	A pair bred close to the reserve; adults regularly hunted over the site.
Kestrel <i>Falco tinnunculus</i>	Frequently observed hunting over reserve. Pair displaying 1 May.
Hobby <i>F. subbuteo</i>	Adults occasionally observed feeding over reserve during mid-May.
Lapwing <i>Vanellus vanellus</i>	Two pairs bred in old peat workings close to the southern boundary of the reserve. Adults frequently observed.
Curlew <i>Numenius arquata</i>	One adult calling and showing a tendency to hold territory 17-19 April
Swift <i>Apus apus</i>	Common, feeding over reserve
Green Woodpecker <i>Picus viridis</i>	Adults occasionally disturbed from decaying birch stumps. A pair bred close to the reserve
Swallow <i>Hirundo rustica</i>	Common, feeding over reserve
House Martin <i>Delichon urbica</i>	Occasionally seen with swallows feeding over reserve
Blackbird <i>Turdus merula</i>	Single males infrequently observed
Goldcrest <i>Regulus regulus</i>	One in song 23 April
Blue Tit <i>Parus caeruleus</i>	Singles on 11 April and 3 May
Jay <i>Garrulus glandarius</i>	Occasionally observed in pursuit of prey
Magpie <i>Pica pica</i>	Singles occasionally observed during May foraging for food
Carriion Crow <i>Corvus corone</i>	One or two generally observed early in the breeding season in search of food
Linnet <i>Acanthis cannabina</i>	Two flying over 23 April
Redpoll <i>A. flammea</i>	Two flying over 14 May
Bullfinch <i>Pyrrhula pyrrhula</i>	A pair near northern boundary 28 May

mire, with a small area of fen along its northern edge. Nine species of birds were recorded breeding on the mire, with an overall density of 150 prs/km², yet the bordering fen edge held 27 species at 800 prs/km². Finnish mires studied by Järvinen and Sammalisto (1976) showed that densities on intact raised mires could vary between 2-200 prs/km².

There is very little data from British cut-over raised mires. Following his survey on Mongan Bog in Co Offaly, Madden found that five species bred on approximately 16 ha of intact mire and 19 species bred on an adjacent 5 ha of cut-over mire. P. Singleton (pers comm) surveyed 46 ha of mire with woodland edge on Roudsea Mosses NNR, Cumbria and found 16 breeding bird species, six of which bred on the open mire, at an overall density of 133 prs/km².

As part of an ecological study on Turraun Cutaway Bog in Co Offaly, Kavanagh (1990) used the results from his bird survey to try and correlate bird species abundance and

TABLE 3
Breeding birds recorded on mire/open habitat on five lowland mires in Britain and Ireland

Species	Thorne Moors NNR 73 ha	Mongan Bog 21 ha	Turraun bog 118 ha	Roudsea Mosses NNR 46 ha	Tarn Moss 45 ha
Greylag Goose <i>Anser anser</i>				*	
Teal <i>Anas crecca</i>	*				
Mallard <i>A. platyrhynchos</i>		*		*	
Red Grouse <i>Lagopus lagopus</i>					*
Moorhen <i>Gallinula chloropus</i>			*		
Lapwing <i>Vanellus vanellus</i>			*		
Snipe <i>Gallinago gallinago</i>	*	*	*		*
Curlew <i>Numerius arquata</i>		*	*	*	*
Redshank <i>Tringa totanus</i>					*
Black-headed Gull <i>Larus ridibundus</i>					*
Cuckoo <i>Cuculus canorus</i>	*			*	
Skylark <i>Alauda arvensis</i>		*	*		*
Tree Pipit <i>Anthus trivialis</i>				*	
Meadow Pipit <i>A. pratensis</i>	*	*	*	*	*
Yellow Wagtail <i>Motacilla flava</i>					*
Whinchat <i>Saxicola rubetra</i>				*	
TOTAL	4	5	6	7	8

TABLE 4
Breeding birds recorded on dry heath/fen edge habitat on five lowland
mires in Britain and Ireland

Species	Thorne Moors NNR 73 ha	Mongan Bog 21 ha	Turraun Bog 118 ha	Roudsea Mosses NNR 46 ha	Tarn Moss 45 ha
Teal					*
<i>Anas crecca</i>					
Buzzard				*	
<i>Buteo buteo</i>					
Grey Partridge			*		
<i>Perdix perdix</i>					
Pheasant			*		*
<i>Phasianus colchicus</i>					
Snipe		*			
<i>Gallinago gallinago</i>					
Woodcock				*	*
<i>Scolopax rusticola</i>					
Woodpigeon	*		*		*
<i>Columba palumbus</i>					
Cuckoo	*	*			*
<i>Cuculus canorus</i>					
Tawny Owl					*
<i>Strix aluco</i>					
Nightjar	*				
<i>Caprimulgus europaeus</i>					
Tree Pipit	*			*	*
<i>Anthus trivialis</i>					
Meadow Pipit	*				*
<i>A. pratensis</i>					
Yellow Wagtail					*
<i>Motacilla flava</i>					
Wren	*	*	*	*	*
<i>Troglodytes troglodytes</i>					
Dunnock		*			*
<i>Prunella modularis</i>					
Robin	*	*	*	*	*
<i>Erythacus rubecula</i>					
Redstart					*
<i>Phoenicurus phoenicurus</i>					
Whinchat	*				
<i>Saxicola rubetra</i>					
Stonechat			*		
<i>S. torquata</i>					

Continued overleaf

	Thorne Moors	Mongan Bog	Turraun Bog	Roudsea Mosses	Tarn Moss
Blackbird <i>Turdus merula</i>		*	*	*	*
Song Thrush <i>T. philomelos</i>		*	*		*
Mistle Thrush <i>T. viscivorus</i>					*
Sedge Warbler <i>Acrocephalus schoenobaenus</i>			*		*
Reed Warbler <i>A. scirpaceus</i>	*				
Whitethroat <i>Sylvia communis</i>	*	*	*		
Chiff Chaff <i>Phylloscopus collybita</i>		*	*	*	
Willow Warbler <i>P. trochilus</i>	*	*	*	*	*
Goldcrest <i>Regulus regulus</i>					*
Willow Tit <i>Parus montanus</i>	*				*
Blue Tit <i>P. caeruleus</i>		*			*
Great Tit <i>P. major</i>		*			*
Magpie <i>Pica pica</i>	*				
Carrion Crow <i>Corvus corone</i>				*	
Starling <i>Sturnus vulgaris</i>		*			*
Chaffinch <i>Fringilla coelebs</i>		*		*	*
Greenfinch <i>Carduelis chloris</i>		*			*
Linnet <i>C. cannabina</i>		*			*
Redpoll <i>C. flammea</i>					*
Yellow Hammer <i>Emberiza citrinella</i>	*				
Reed Bunting <i>E. schoeniclus</i>	*	*			
TOTAL	13	19	12	10	27

TABLE 5

Birds recorded breeding on open cut-over mire habitat on Thorne Moors (Bain 1991)

Species	Breeding pairs
Teal <i>Anas crecca</i>	6
Kestrel <i>Falco tinnunculus</i>	1
Red-legged Partridge <i>Alectoris rufa</i>	1
Grey Partridge <i>Perdix perdix</i>	1
Moorhen <i>Gallinula chloropus</i>	1
Lapwing <i>Venellus vanellus</i>	2
Woodpigeon <i>Columba palumbus</i>	1
Turtle Dove <i>Streptopelia turtur</i>	2
Nightjar <i>Caprimulgus europaeus</i>	12
Wren <i>Troglodytes troglodytes</i>	3
Whinchat <i>Saxicola rubetra</i>	8
Robin <i>Erithacus rubecula</i>	1
Whitethroat <i>Sylvia communis</i>	7
Willow Warbler <i>Phylloscopus trochilus</i>	8
Meadow Pipit <i>Anthus pratensis</i>	2
Tree Pipit <i>A. trivialis</i>	2
Linnet <i>Carduelis cannabina</i>	2
Redpoll <i>C. flammea</i>	2
Chaffinch <i>Fringilla coelebs</i>	1
Yellowhammer <i>Emberiza citrinella</i>	6
Reed Bunting <i>E. schoeniclus</i>	4

diversity with habitat quality. The 118 ha survey area was marked out into 18 x 200m² tetrads. Within each tetrad the relative abundance for each species was compared with vegetation structure and peat depth. A total of 18 bird species was recorded breeding with a further 25 species observed.

The work undertaken by Limbert, Mitchell and Rhodes (1986) reviews the avifaunal records of Thorne Moors up to the end of 1982, and a supplement written by Limbert (1990) updates the documentation to the end of 1989. This work forms a major contribution to the historical and recent collation of ornithological data for the Moors. However, the recording techniques of the past often do not allow an insight into quantitative bird distribution and this is reflected in the published results.

Results from the Thorne Moors NNR survey found 16 breeding species on 73 ha, giving a total of 68 pairs, a density of 93prs/km². Of this, only eight pairs bred on the mire surface of the disused peat cuttings, whilst 59 pairs bred on the remaining birch, heather and fen habitats. In 1990 a wider ranging ornithological survey of Thorne, Goole, Rawcliffe and Crowle Moors, documented by Bain (1991) showed a total of 21 species breeding on 191 ha of cut-over mire habitat, which included abandoned wet peat cuttings and dry baulks with heather and birch scrub (Table 5). Species breeding were similar to those found on the NNR, additional records include Kestrel, Red-legged Partridge *Alectoris rufa*, Grey

Partridge *Perdix perdix*, Moorhen *Gallinula chloropus*, Lapwing *Vanellus vanellus*, Turtle Dove *Streptopelia turtur*, Linnet *Carduelis cannabina*, Redpoll *C. flammea* and Chaffinch *Fringilla coelebs*. A total of 73 pairs gave a density of 38 prs/km², this excludes the NNR records.

Data from the few mire sites which have been studied for breeding birds, clearly shows a wide range in the number of species, yet as expected, the lower density is on the open mire areas of *Sphagnum* and cotton grass. Here Teal, Mallard *Anas platyrhynchos*, Snipe, Curlew *Numenius arquata*, Redshank *Tringa totanus*, Skylark *Alauda arvensis*, and Meadow Pipit may breed. Numbers of bird species and their breeding density generally increases with the development of scrub and fen. However, the bird assemblage is usually dominated by the smaller passerines, with specialists of more open habitats such as



FIGURE 3

Thorne Moors National Nature Reserve showing an abandoned peat cutting with mire vegetation and a drier peat baulk supporting heath communities.

wildfowl and waders being gradually lost. Some birds, for example, Tree Pipit and Whinchat, use the edge habitat between scrub and mire, breeding close to the ground in vegetation on drier peat surfaces, using prominent birch stumps for song posts and feeding mainly over the mire surface for invertebrates. This was particularly noted on Thorne Moors NNR, and Hayrinne *et al* (1986) made special reference to Whinchat favouring the edge of a raised mire in North Karelia.

Although there are few bird species which breed on lowland raised mires and the densities are usually low, this specialised habitat is of high conservation importance due to its unique flora and fauna. It is also an extremely vulnerable habitat; since the middle of the last century there has been a 96% loss of lowland raised mires in Britain as a result of drainage, agricultural land claim, afforestation and peat winning (Farrar and Davies 1991). However, in some European countries raised mires have been totally destroyed, thus placing Britain's remaining 4% of surviving raised mires in a position of high importance in a European context (Stroud *et al* 1990). Even the cut-over sites offer a range of habitat types which are of considerable conservation interest. The habitats developing on such sites

are an ecological mimic of wetland scrub habitat (Figure 3) that has elsewhere been lost through damage and agricultural intensification.

Further information is required on the numbers and species of breeding, passage and wintering birds of cut-over raised mires. The surface vegetation of a cut-over raised mire varies with the length of time since parts of the mire were last worked for peat and hence the bird fauna might be predicted to change over time. Other influences include peripheral drainage, the height of the water table, scrub encroachment and fire. Monitoring is therefore necessary to assess the ornithological impact of any major changes in the habitat and this data will be of particular importance when considering the restorative management of cut-over raised mires elsewhere.

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POSTSCRIPT

Since this paper was written and accepted for publication, an agreement has been reached between English Nature and Fisons plc which will extend the National Nature Reserve to include all the vegetated abandoned peat cuttings in the southern half of Thorne Moors.

BOOK REVIEW

Crucifers of Great Britain and Ireland by T. C. G. Rich. Pp. 336, with most plants illustrated and drawn to a standard format and many descriptive illustrations. 60 distribution maps. Botanical Society of the British Isles, London, 1991. £10.75.

This is the sixth of the B.S.B.I. Handbooks which deal with some of the more difficult groups of plants found in the British Isles. A more comprehensive guide to the crucifer family of plants, which many botanists have to struggle with, has long been needed. So many of our "weeds" belong to this family and so many botanists tend to dismiss them as "those troublesome yellow or white jobs". Several of them are aliens which have established themselves around our main ports and have subsequently spread inland to colonize both waste and cultivated land.

One local problem here at Teesside was solved by this book in that *Sisymbrium orientale* is described as producing entire leaves late in the season – a fact which hitherto had puzzled us on finding several such plants which did not correspond to the universal description of *S. orientale*.

The drawings are a very useful guide especially for those who rely upon illustrations for their identification. The descriptions may be rather technical-sounding for the beginner, but they are ideal for the taxonomist. It is, of course, essential that the introductory explanations and keys are studied before using the main descriptions.

It would, perhaps, have been helpful to include old nomenclature where new nomenclature is given, but that only seems to apply to the genus *Rhyncosinapis* which is evidently now *Coincya*!

On balance, I am sure that Tim Rich's guide is an essential addition to the serious botanist's library.

ACULEATE WASPS AND BEES (HYMENOPTERA: ACULEATA) OF SKIPWITH COMMON AND A COMPARISON OF SKIPWITH COMMON WITH ALLERTHORPE AND STRENSALL COMMONS

MICHAEL E. ARCHER

Skipwith Common has been found to be a very good locality for aculeates, with 91 species recorded, two species being national notables and two species notable in a Watsonian Yorkshire context.

Skipwith Common is an area of about 312 ha. situated about 10 miles south of York (VC61; SE63). The Common is a flat area of lowland heath on glacial sands. Wet and dry heath are present although there is an extensive invasion of bracken and silver birch, pine and oak. The Common has a number of small ponds and drains and ruderal vegetation around the old aerodrome buildings and runways. The shallow ponds were created by peat cutting and parts of the Common were grazed by cattle and sheep and still are by sheep. The Common is much wetter than the other two lowland heaths of the Vale of York, called Allerthorpe and Strensall Commons.

The aculeate wasps and bees of Allerthorpe and Strensall Commons have already been described (Archer, 1988, 1989b). This paper will compare the solitary aculeate species of the three Commons.

From voucher specimens and written record it has proved possible to trace 29 visits by other entomologists to Skipwith Common. W. J. Fordham (1909-1923) made 11 visits, J. W. Carter (1919) one visit, J. Wood (1927, 1930) two visits, M. D. Barnes (1937) one visit, J. H. Elliott (1950) one visit, J. H. Flint (1965-1977) nine visits, W. A. Ely (1977, 1988) two visits, A. Norris (1980) one visit and R. B. Angus (1990) one visit. Ant records are also available from D. J. Richardson (1980), W. A. Ely (1988) and Lawton & Heads (1984). My 33 visits (Archer sample) consist of 14 visits during the 1970s and 18 visits during the 1980s, with one early visit during 1968. During each of my visits all species found were recorded. Specimens were collected visually with a hand net. My visits were distributed throughout the year as follows: April (5 visits), May (7), June (8), July (6), August (5), September (2). I am grateful to curators of the following museums for access to their collections: Keighley, Manchester, Rotherham, Scarborough, York; and to J. H. Flint, W. A. Ely, A. Norris and R. B. Angus for access to their personal collections. J. Burn identified the bethylid recorded by R. B. Angus.

RESULTS

Species present at Skipwith Common

At the family level, the taxonomic distribution of species is given in Table 1. The 91 recorded species represents 30% of the Watsonian Yorkshire and 15% of the British Isles.

The bethylid species was *Cephalomonia formiciformis* and social species consisted of the ant species: *Formica lemani*, *Myrmica ruginodis*, *M. scabrinodis*, *Leptothorax acervorum*, *Lasius niger*; the social wasps: *Vespula rufa*, *Dolichovespula sylvestris*, *Paravespula vulgaris*; and social bees: *Bombus lucorum*, *B. terrestris*, *B. lapidarius*, *B. jonellus*, *B. pratorum*, *B. hortorum*, *B. pascuorum*, *Psithyrus barbutellus*, *P. bohemicus*, *P. campestris*, *P. sylvestris*, *P. vestalis*, *Apis mellifera*. The nomenclature is according to Kloet and Hincks (1978).

The Archer sample of species of solitary wasps and bees consists of 193 records representing 56 species where a record would be a specimen differing in one of the following three variables: name, sex and day of visit. Thirty-nine species (69.9%) were recorded on one, two or three days (the unusual species) while the other 17 species (30.4%) each were recorded on four to 15 days (the common species) (Table 2). Solitary wasp and

TABLE 1
The number of species of aculeate Hymenoptera found at Skipwith Common and the three Commons of Allerthorpe, Strensall and Skipwith combined

Family	Skipwith	Number of species	
		Combined three	
Dryinidae	0		3
Bethylidae	1		2
Chrysidae	2		10
Tiphidae	1		1
Mutillidae	0		1
Formicidae	5		8
Pompilidae	7		17
Eumenidae	4		8
Vespidae	3		6
Sphecidae	24		48
Colletidae	3		5
Andrenidae	7		24
Halicidae	10		19
Megachilidae	5		11
Anthophoridae	6		12
Apidae	13		18
Total	91		193

bee species found at Skipwith Common but not recorded in the Archer sample are: *Priocnemis parvula*, *Anoplius concinnus*, *Odynerus spinipes*, *Crossocerus elongatus*, *C. tarsatus*, *Ectemnius cavifrons*, *Rhopalium clavipes*, *R. coarctatum*, *Ammophila sabulosa*, *Colletes daviesanus*, *Andrena bicolor*, *A. minutula*, *Nomada ruficornis*.

In a national context two species, *Priocnemis schioedtei* and *Nysson trimaculatus*, are notable species category b, being recorded in 31-100 10 km squares. Although *P. schioedtei* is very local in the south of England, it is a common species in Watsonian Yorkshire (Archer, 1989a). *N. trimaculatus* reaches the northern border of its range in Watsonian Yorkshire.

In a Watsonian Yorkshire context two species are notable. *Psenulus atratus* is rare and of the eleven known records of *Megachile ligniseca* seven are from Skipwith Common.

Seasonal progression at Skipwith Common

For the Archer sample, the number of solitary species recorded in each month and the new species seen each month are given in Table 3. The most productive months for numbers of species were June, July and August and for new species June and July.

During April and May only the mining bees of the genera *Andrena*, *Halictus* and *Lasioglossum* with their cleptoparasites *Nomada* and *Sphecodes* were present. Particularly noticeable were *Andrena barbilabris*, *Lasioglossum calceatum* and *L. rufitarse*. Most of the *Andrena* species were gone by June except *A. barbilabris* which could be found until July. The summer species *A. denticulata* occurred from July until September. The *Lasioglossum* species also persisted until September.

From June the summer fauna emerged, some of which persisted until September. Among the bee species were *Colletes* with their cleptoparasites *Epeorus*, *Hylaeus*, *Osmia* and

TABLE 2
The number of days on which each species of solitary wasp and bee was recorded at
Skipwith Common from the Archer sample

No. days	Species	No. species
1	<i>Omalus panzeri, Chrysis ignita, Myrmosa atra, Arachnosphila spissa, Priocnemis fennica, P. schioedtei, Ancistrocerus parietinus, Crossocerus megacephalus, C. annulipes, C. nigritus, Psen equestris, P. dahlbomi, Psenulus atratus, Nysson spinosus, N. trimaculatus, Andrena scotica, Sphecodes gibbus, S. hyalinatus, Osmia rufa, Megachile centuncularis, Nomada goodeniana</i>	21
2	<i>Symmorphus mutinensis, Trypoxyylon attenuatum, Crossocerus ovalis, Colletes succinctus, Halictus rubicundus, Sphecodes pellucidus, Megachile willugbiella, Nomada fabricana, N. marshamella, Epeolus cruciger</i>	10
3	<i>Arachnospila anceps, Crabro cribrarius, Crossocerus pusillus, Ectemnius lapidarius, Gorytes quadrifasciatus, Andrena denticulata, A. haemorrhoa, Sphecodes fasciatus</i>	8
4	<i>Crossocerus quadrimaculatus</i>	1
5	<i>Ancistrocerus trifasciatus, Mellinus arvensis, Argogorytes mystaceus, Hylaeus communis, Lasioglossum albipes, Sphecodes monilicornis</i>	6
6	<i>Nomada leucophaetha</i>	1
7	<i>Anoplius nigerrimus, Megachile ligniseca</i>	2
8	<i>Lasioglossum fratellum, Megachile versicolor</i>	2
9	<i>Oxybelus uniglumis, Andrena clarkella</i>	2
12	<i>Lasioglossum rufitarse</i>	1
13	<i>Andrena barbilabris</i>	1
15	<i>Lasioglossum calceatum</i>	1

TABLE 3
The number of species of solitary wasps and bees recorded per month and new
species seen each month at Skipwith Common from the Archer sample

	April	May	June	July	August	September
No. of species	6	15	26	23	25	15
No. new species	6	9	19	12	8	2

TABLE 4
The relative frequency of the cleptoparasitic species among the solitary wasps and
bees from Skipwith Common (Bethylid excluded)

	No. hosts (H)	No. cleptoparasites (C)	Cleptoparasitic load CL=100x(C/H+C)
Solitary wasps	33	5	13.2
Solitary bees	20	11	35.5

Megachile. *M. versicolor* and *M. ligniseca* were particularly noticeable. However, no species of *Coelioxys*, the cleptoparasites of *Megachile*, have been recorded. Among the wasp species pompilids, eumenids and sphecids with their cleptoparasites, the chrysids and *Myrmosa* appeared. Particularly noticeable were *Oxybelus uniglumis* with the females carrying small flies on their stings. *Anoplus nigerrimus* flying close to the ground hunting spiders, males of *Ancistrocerus trifasciatus* flying up-and-down in sheltered sunny places probably searching for females, females of *Mellinus arvensis* returning to their burrows with larger flies and *Argogorytes mystaceus* taking nectar from umbelliferous flowers.

Cleptoparasitic load and aerial nester frequency at Skipwith Common

The cleptoparasitic load (CL) is the percentage of species that are cleptoparasites on other aculeate wasps and bees. The CL for solitary bees species is higher than for the solitary wasp species (Table 4). The aerial nester frequency (AF) is the percentage of the host or non-cleptoparasitic species that have aerial nests. The AF is higher for the solitary wasp species (Table 5).

COMPARISON OF THE THREE COMMONS

The species

The data from the three Commons is arranged in four data sets: Allerthorpe (pre- and post-coniferisation), Strensall and Skipwith. Combining the data for the three Commons (Table 1) shows that 193 species have been recorded which is nearly 64% of the Watsonian Yorkshire and 32% of the British lists. Excluding the Dryinidae and Bethylidae, which are probably under recorded, then 36% of the British list has been found on the three Commons. My own recordings has been of 113 species which is nearly 49% of the Watsonian Yorkshire list. The importance of lowland sandy or heathland sites in a Watsonian Yorkshire or British context for this group of insects is therefore well established.

The number of solitary wasp (excluding dryinids & bethylids) and bee species found on the three Commons is given in Table 6. Allerthorpe Common (pre-coniferisation) has the greatest number of species followed by Strensall, Allerthorpe (post-coniferisation) and Skipwith Commons. The larger number of species for Allerthorpe (pre-coniferisation) Common could be consequence of the much larger number of records or visits to this site (Table 7). The mean number of records per visit is always lower for the other entomologists compared with Archer (Table 7). This is probably because the other entomologists were selective in what species they recorded instead of recording all species as practised by Archer. Please note that the record of *Nomada tormentillae*, a Red Data Book category 3 species, from Strensall Common was missed by Archer (1988); also *Crossocerus quadrifasciatus* in Table 4 (Archer, 1989b) relating to Allerthorpe Common should be *Gorytes quadrifasciatus*.

Similarity Indices

The four data sets from Allerthorpe (pre- and post-coniferisation), Strensall and Skipwith Commons can be compared by calculating a similarity index between each pair of data sets. The results of using the simple Jaccard index (Magurran, 1988), which depends upon the presence or absence of species, are given in Table 8. The similarity indices, which vary from 40% to 50%, indicate large differences between the data sets either because of differences in species richness or in sample size. The Morisita-Horn index, which uses quantitative information on the relative abundance of species, is relatively independent of sample size but gives more importance to the abundances of the most abundant species (Magurran, 1988). Compared with the Jaccard index the similarity indices of the Morisita-Horn index are increased (Table 8) with values from 49% to 74%. In particular the similarity of pre- and post-coniferisation Allerthorpe Common are more similar to each other. However, even with the Morisita-Horn index there are still large differences between the data sets. Why do these differences exist? They could be a consequence of

TABLE 5
The nesting habits of the host wasp and bee species at Skipwith Common

	No. soil nesters (S)	No. aerial nesters (A)	Aerial nester frequency AF=100x A(A/S)
Solitary wasps	19	14	42.4
Solitary bees	14	6	30.0

TABLE 6
The number of species of solitary wasps and bees in the data sets from Allerthorpe (pre- and post-coniferisation), Strensall and Skipwith Commons (Dryinids and Bethylids excluded)

	No. solitary wasps	No. solitary Bees	Total species
Pre-Allerthorpe	65	64	129
Post-Allerthorpe	36	39	75
Strensall	51	40	91
Skipwith	38	31	69

TABLE 7
The number of solitary wasp and bee records from and visits made to Allerthorpe (pre- and post-coniferised), Strensall, and Skipwith Commons by Archer and other entomologists (Dryinids and Bethylids excluded)

	Pre-Allerthorpe	Post-Allerthorpe	Strensall	Skipwith
<i>No. records:</i>				
Archer	—	387	318	193
Others	797	29	48	54
Total	797	416	366	247
<i>No. visits:</i>				
Archer	—	76	70	33
Others	224	6	22	28
Total	224	82	92	61
<i>Records/Visits:</i>				
Archer	—	5.1	4.5	5.8
Others	3.6	4.8	2.2	1.9

TABLE 8
The Jaccard and Morisita-Horn Similarity Indices of the solitary wasp and bee species between Allerthorpe (pre- and post-coniferisation), Strensall and Skipwith Commons (Dryinids and Bethylids excluded)

Jaccard	Post-Allerthorpe	Strensall	Skipwith
Pre-Allerthorpe	0.49	0.49	0.40
Post-Allerthorpe		0.50	0.41
Strensall			0.42
Morisita-Horn	Post-Allerthorpe	Strensall	Skipwith
Pre-Allerthorpe	0.74	0.59	0.59
Post-Allerthorpe		0.51	0.61
Strensall			0.49

TABLE 9
The number of species of solitary wasps and bees found in one, two, three or four data sets from Allerthorpe (pre- and post-coniferisation) Strensall and Skipwith Commons (Dryinids and Bethylids excluded)

No. species	No. data sets	% of species
49	1	31.4
39	2	25.0
35	3	22.4
33	4	21.2

genuine differences in species diversity or sampling errors due to small sample size. Low sample size relative to high species diversity would increase sampling error. According to Wolda (1981) species diversity from the four data sets may be considered low and sample size low to median, a relationship which could tend to reduce sampling errors.

The number in species found at one, two, three or four data sets are given in Table 9. The largest category of 49 species is only found in one set of data. Of these 49 species, 40 species (81.6%) are only based on one, two or three records (unusual species). Thus the absence of a species from a particular site could easily be a consequence of the difficulty of finding a particular species.

In conclusion it is difficult to show differences in species diversity between the four data sets because the chances of recording many species is very low. The total data set of the solitary wasp and bee species consists of 1826 records. 24 species (15.4% of species) were only recorded on one occasion which is equivalent to a 0.0005 chance of finding each of these 24 species.

Cleptoparasitic loads

The cleptoparasitic loads (CLs) for the solitary wasp and bee species from Allerthorpe and Strensall Commons are given in Table 10 for comparison with the data for Skipwith Common (Table 4). The CLs are relatively constant varying from 13% to 18% for the solitary wasp species and from 33% to 36% for the solitary bee species. Weislo (1987)

showed that facultative parasitic behaviour among aculeate Hymenoptera correlated with geographical latitude. Thus the parasitic rates are higher in temperate regions as host populations are more synchronised in their life history characteristics. Since the four data sets were collected within a very small geographical area variations of CLs would not be expected.

Aerial nester frequency

The aerial nester frequencies (AFs) for the solitary wasp species are relatively constant (Tables 5, 10) except for the post-coniferisation Allerthorpe data where the lower value is

TABLE 10
The cleptoparasitic loads (CLs) and aerial nester frequencies (AFs)
among the species of solitary wasps and bees in the data sets of
Allerthorpe (pre- and post-coniferisation) and Strensall Commons
(Dryinids and Bethylids excluded)

	Pre-Allerthorpe	Post-Allerthorpe	Strensall
CLs			
Solitary wasps	16.9	13.9	18.0
Solitary bees	32.8	35.9	35.0
AFs			
Solitary wasps	45.3	20.0	41.5
Solitary bees	16.3	8.0	19.2

due to the loss of aerial nesters (Archer, 1989b, Table 8 but note Aerial nests and Soil nests columns should be reversed). The AFs for the solitary bee species are more variable with a low value for the post-coniferisation Allerthorpe data and a high value for the Skipwith Common data. Again the low value for the post-coniferisation Allerthorpe data is due to the loss of aerial nesters. The high value of the Skipwith Common data is due to relatively fewer soil nesters which is probably related to the much wetter conditions of Skipwith Common.

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BOOK REVIEWS

Velvet Mites and Silken Webs. The Wonderful Details of Nature in Photographs and Essays by Scott Camazine. Pp. 178, with colour plates. Wiley, 1991. \$24.95.

Scott Camazine is a physician and research biologist at Cornell University with an interest in nature photography for which he has won major prizes. The author looks at the natural world through the eye of a poet and scientist. By looking at nature close-up he hopes to arouse curiosity, sharpen powers of observation and increase understanding. He finds that the discipline of photography enables him to achieve these aims. The book consists of about 40 essays, each of a few pages with a colour photograph, covering some aspect of nature. Each essay ends with suggestions for further reading which will often lead the reader into the academic literature. Of the 40 essays 12 deal with species or species groups of vertebrates including the human being plus an account of feathers; 14 deal with invertebrates including the fossil group of trilobites, ten deal with plants, two cover the topics of diversity and the Amazon and two the inanimate world of icicles and snowflakes. A final chapter gives some useful hints on close-up photography.

MEA

Recent Surveys and Research on Butterflies in Britain and Ireland: a species index and bibliography compiled by Paul T. Harding and Stuart V. Green. Pp. 48. 1991. From Publication Sales, Institute of Terrestrial Ecology, Merlewood Research Station, Grange-over-Sands, Cumbria LA11 6JU. £2.50 incl. p&p..

This is the first of an occasional series of bibliographies relevant to biogeographical studies. The species index has bold headings in English and Latin and the bibliography has clear authors' names followed by a very brief summary, date and publication reference. It deals with studies in the 1970s and 80s. Most references seem to indicate the work of professionals. One wonders how complete the search has been; for instance there is no reference to the 1987 Game Conservancy paper by Dr. John W. Dover "An investigation into the effects of Conservation Headlands in Cereal Fields on Butterfly Populations". Perusal through regional society newsletters would produce many more references. It is an essential publication for those studying British butterflies and will save time looking up references or duplicating work. At this modest price all lepidopterists should invest in a copy.

JP

Understanding Your Garden by Stefan Buczacki. Pp. 180, with full colour illustrations. Cambridge University Press, 1990. £14.95.

What a good writer and communicator Stefan Buczacki is – sane, sensible, eminently practical and very readable. "This book" he announces at the beginning of Chapter 3 "is essentially about the cultivation of plants and the site within which they are grown, the garden". Explaining the scientific rationale underlying gardening practices with admirable clarity, he takes nothing on trust and, along the way, refutes a number of myths perpetrated by generations of gardening pundits who have never, unlike Buczacki, taken the trouble to test such theories scientifically – his exposition of the pros and cons of such contentious issues as the use of "organic" versus "chemical" fertilizers should be required reading by all would-be organic gardeners. A most useful and informative book, well worth purchasing.

VAH

DROSOPHILA FENESTRARUM FROM LEEDS, YORKSHIRE, A NEW RECORD FOR NORTHERN ENGLAND, WITH NOTES ON LARVAL FEEDING SITES

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ABSTRACT

We report here the rearing of *Drosophila fenestrarum* Fallen 1823 (Diptera: Drosophilidae), not previously recorded in Yorkshire or northern England, from rotting stems of several plant species. We discuss the types of substrate fed on by larvae of this species in the UK.

INTRODUCTION

There are thirty-three species of *Drosophila* (fruit-flies) recorded from the British Isles (Kloet & Hincks 1976, Newbury *et al.* 1984) of which *D. melanogaster* and *D. subobscura* are the most frequently encountered. Although widespread in Europe (Wheeler 1981) *Drosophila fenestrarum* has been collected infrequently in the British Isles. It has been recorded from Scotland (Basden 1954) and from most Welsh counties but records from England are confined to counties south of Herefordshire (BM(NH) Drosophilidae database 1991). There are no records from any of the northern counties.

The substrates used by *D. fenestrarum* in the British Isles for oviposition and for larval feeding are largely unknown. Although *D. melanogaster*, *D. subobscura* and several other species develop on fruit, it is unlikely that *D. fenestrarum* frequently does so. Species that develop on fruit are attracted to fermenting fruit baits but these do not attract *D. fenestrarum* adults (Bächli & Burla 1985, Basden 1954). The species was thought to be associated with water because adults have been caught over watercress (Basden 1954, Thaler 1977) but there are no records of it being reared from aquatic vegetation in the United Kingdom.

METHODS

In August 1990 we collected soft, rotten, leaf-stalks of giant hogweed, *Heracleum mantegazzianum*, from St George's Field, Leeds, West Yorkshire. St George's Field is a deconsecrated graveyard in the north-west corner of the Leeds University campus (Grid ref. SE 429434, altitude 95m). Small clumps of scrubby vegetation, trees and bushes, in some of which giant hogweed grows, are separated by closely mown grass. Collections of giant hogweed from St George's Field were repeated in 1991. In August and September 1991 we also collected rotten leaf-stalks of water dropwort, *Oenanthe crocata*, (Umbelliferae) and of an arum, *Calla sp.* (Araceae) (not *Calla palustris*) from Adel Dam nature reserve, 8km north of Leeds (Grid ref. SE 273415, altitude 120m) (detailed description in Shorrocks 1975). During the same period we collected rhubarb, *Rheum rhabonticum* (Polygonaceae) from a walled garden at Arthington, 12km north of Leeds and 3km from Adel (Grid ref. SE 275450, altitude 55m). The garden at Arthington is surrounded by grassland and deciduous woodland.

In both years adult flies were reared out of the rotten stems in a greenhouse insectary with natural light and temperature. Each of the stems was kept individually in clear plastic beakers over moist sand. They were checked two or three times a week and any flies that had emerged were collected.

RESULTS

In 1990 two female and two male *D. fenestrarum* emerged from one of the stems on 3 September, two weeks after collection, and were transferred to a vial of standard cereal-based drosophila medium (Shorrocks 1972). They were maintained in an incubator at 20°C, L:D 12:12 and approximately 60% RH but we were unable to culture them. The females laid numerous eggs but all the eggs developed irregular swellings and none hatched out. The

flies died seven to eight weeks after their emergence.

Flies emerged from collections made in 1991 between 19 and 23 days after the samples were collected. Some of these flies were transferred to a vial of malt medium (Lakovaara 1969) and later to sections of rotting rhubarb stem. Others were put in vials of standard medium to which spinach leaves had been added. All vials were again maintained at 20°C, L:D 12:12 and approximately 60% RH. Eggs were laid, and hatched, on all of these substrates and the larvae developed successfully. The life cycle from egg to adult took 36 days on malt medium. On rhubarb and on spinach medium, however, the larvae reached the fourth, final, instar in about 30 days but all these larvae failed to pupate.

Two other drosophilid species, *Drosophila subobscura* and *Scaptomyza pallida* were also reared from the rotting stems collected from Adel, Arthington and St George's Field. *Drosophila subobscura* larvae also develop in fruit or fungi but those of *S. pallida* feed predominantly on rotting plant material. Both are far commoner and more widespread than *D. fenestrarum*.

DISCUSSION

These collections are the first published records of *D. fenestrarum* from Yorkshire and from northern England (Figure 1). The lack of records is not due to climate because there are records from further north: Scotland (Basden, 1954), Denmark (Frydenberg 1956) and Sweden (Rasmussen & Johansson 1969). The species has also been collected from the southern English counties (BM(NH) Drosophilidae database 1991) and from southern Europe (Shorrocks 1972). It is probable therefore that the absence of records of this species from northern England indicates only that collections have not been made in this region.

Despite being called fruit-flies many species of *Drosophila* use fungi or rotting plants as a food source for their larvae (Begon & Shorrocks 1978, Shorrocks 1981). The fruit feeding species are best known because fruit substrates have been sampled most frequently.

Fermenting fruit baits do not attract adult *D. fenestrarum* (Bächli & Burla 1985, Basden 1954, Frydenberg 1956) and in consequence it is unlikely that the females will lay eggs in fruit very often. Such substrates will not therefore be exploited by the larvae. The species is almost unknown from fruit and has not been reared from fruit collected in or near Leeds

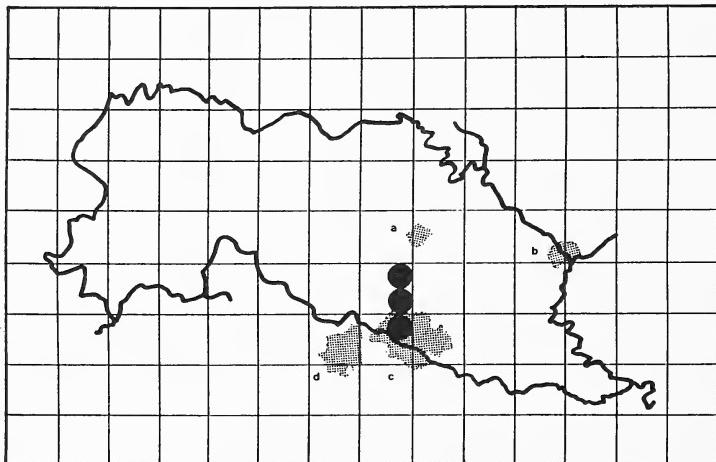


FIGURE 1
Collection locations for *Drosophila fenestrarum* in Yorkshire
(within 10km squares of vice-county 64).
(a=Harrogate, b=York, c=Leeds, d=Bradford)

despite many years of sampling. There is, however, a record of the species from deadly nightshade, *Atropa belladonna*, in Switzerland (Schatzmann 1977).

In Germany *D. fenestrarum* has been recorded from rotting red cabbage (Herting 1955) and, in 1990-1991, from plant stems, pretreated by deep freezing to promote rotting, exposed near Munich (Offenberger & Klarenberg 1992). In the Munich study, *D. fenestrarum* emerged from five of the 16 plant species used including common hogweed, *Heracleum spondylium*, but giant hogweed was not tested. In the Netherlands, Janssen, Driessen, de Haan and Roodbol (1988) failed to rear the species from fruit or fungi but did find it in rotting stems of giant hogweed and burdock, *Arctium* spp. During more recent collections in the Netherlands it was also reared from butter-burr, *Petasites hybridus*, and rhubarb stems and from the leaves of bluebell, *Endymion subscriptus*, (J. J. M. van Alphen, pers. comm.).

Our findings confirm that, in northern England as in the rest of Europe, *D. fenestrarum* is a species that exploits rotting plants as oviposition sites and for larval development. More extensive rearing from rotting plant material would probably reveal that the species is less infrequent than currently thought. The larvae will develop on malt medium in the laboratory even though malt does not attract the adults (Lakovaara *et al.* 1969). The life cycle from egg to adult is about five weeks under the rearing conditions we used but it is likely to be longer in the field because of the lower temperatures there. Our failure to rear the species on rhubarb may have been because the parents had been collected too late in the year.

Although both the arum species and the water dropwort grow in marshy ground at Adel Dam, water is not a feature of either St George's Field or Arthington. We do not feel therefore that *D. fenestrarum* has any particular association with water or with aquatic vegetation. Frydenberg (1956) caught all his specimens in small groups of trees surrounded by open ground and observed that *D. fenestrarum* was not a species of thick woods. This may well be true since two of our sampling sites have small groups of trees standing in open ground and the Adel Dam material was collected from a woodland edge location.

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Dr D. D. Bartley, University of Leeds, UK, identified the *Calla* sp. and *Oenanthe crocata*. We are grateful to Mrs Sheepshanks for allowing access to her property at Arthington Hall and to the Yorkshire Wildlife Trust for permission to sample in the Adel Dam nature reserve.

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BOOK REVIEW

Mosquitoes by K. R. Snow. Pp. 66, with 41 figures & 4 plates. Naturalists' Handbooks, Richmond Publishing. £13.00 hardback, £7.95 paperback.

Another superb book in an excellent series, this is of great value to beginner and long-term devotee alike.

The Culicidae or Mosquitoes, is one of those very few families of insects whose larval, pupal and adult morphological features are so characteristic that none of the species can be confused with any other insects. With very little practice those with no prior knowledge of Diptera can readily recognise a mosquito in all its active stages of development in the field. There are 32 known British species, many of them common, and globally the family is of major economic, veterinary and medical importance. In short this is an ideal group in which to specialize, and this is the ideal book with which to commence the study. The amount of information provided on the 66 pages is truly staggering. This is no coffee-table glossy; indeed the aesthetic appearance of many pages has suffered from the sheer quantity of data although this is by no means a criticism! It is real value for money.

It may appear paradoxical that whilst the biology of many tropical mosquitoes is known in great detail, much remains to be learnt of many of our native species. Here again this book highlights gaps in our knowledge and provides a wealth of practical advice on worthwhile research programmes and appropriate techniques. Keys are provided, as far as is possible, to eggs, larvae, pupae and adults of all of our species along with ecological and distributional data. A very pleasing feature is the inclusion of Terzi's classic paintings of eight of our mosquitoes which first appeared in Marshall's masterly monograph published by the British Museum (Natural History) in 1938.

As with many dipterous families today, there is a recording scheme for British mosquitoes whose organisers will be delighted to welcome new recruits to their modest ranks.

ARCHIVES OF THE YORKSHIRE NATURALISTS' UNION

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and

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In 1972, the Officers of the Yorkshire Naturalists' Union deposited a series of minute books, cash books, ledgers, reports, record books, published materials, letters, etc. (Accession no. 1713) with the Leeds Archives Department, now the Leeds District Archives of the West Yorkshire Archive Service. These items (1-35) and subsequent deposits (items 36-145, added 1975, acc. no. 1911; items 146-158, added 1980, acc. no. 2408; items 159-166, added 1983, acc. no. 2678; item 167, added 1988, acc. no. 3170; items 168-169, added 1989, acc. no. 3297; item 170, added 1989, acc. no. 3330; item 171, added 1990, acc. no. 3461; items 172-179, added 1991, acc. no. 3476) are on loan to the Archive Service, and the ownership still rests with the Yorkshire Naturalists' Union.

For those wishing to research these collections, restrictions apply to all items less than 30 years old (based on the date of the last entry in the volume or file). Therefore, those wishing to examine such items should seek written consent of an Officer of the Union. Furthermore, no records may be published in whole or part without the permission of the depositor, in this case the Executive of the Union.

The 179 items listed below include botanical locality records of W. J. Fordham, 1887-1908, and the minute books of the Union's Botanical, Bryological, Entomological and Geological Sections, as well as the minute books of the Union itself. The Union's archives also contain many hundreds of letters and papers relating to conservation in Yorkshire, personal diaries, record books, newspaper cuttings and other ephemera gathered together by the Union's Officers over many years.

In 1977 and 1978 the Yorkshire Conchological Society and the Conchological Society of Great Britain and Ireland respectively also deposited their archives in the Leeds District Archives, as did other organisations such as the Leeds Naturalists' Club and Scientific Association. The inter-relationships of these societies, including the Yorkshire Naturalists' Union, in their early years make these joint archives particularly valuable to those researching the history of natural history in Yorkshire.

Yorkshire Naturalists' Union archive material also rests in the hands of its current Officers and will from time to time be added to the Leeds District Archive. The Union also possesses numerous books in the form of two library collections currently housed at Bradford University and the Doncaster Museum; the former collection contains the important annotated volumes relating to G. Massee and C. Crossland's "Fungus Flora of Yorkshire". Lists of the contents of these two collections are available, and access to work on them is readily granted to members of the Union through its Officers. Additional items for depositing in the Leeds District Archives and in the Union's libraries are always appreciated.

YORKSHIRE NATURALISTS' UNION RECORDS

Yorkshire Naturalists' Club

1. Minute Book	1849-55
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West Riding Consolidated Naturalists' Society

2. Minute Book	1861-71
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3.	Minute Book	1876-8
Yorkshire Naturalists' Union		
4.	Minute Book	1879
5.	Minute Book	1882-3
6.	Minute Book	1930-50
7.	Proceedings and Cuttings relating to the Grand Exhibition, Leeds 1879	
8.	"Important Documents" Book . Papers relating to publications, premises etc.	c.1903-6
9.	Key and Index to Annual Meetings, Excursions etc.	1877-1961
10.	Miscellaneous, including circulars 1906-15 and Annual Reports	1909-13
11.	Cash Book	1885-91
12.	Cash Book	1892-98
13.	Cash Book	1899-1902
14.	Ledger	1886-1900
15.	Circulars	1906-1963 (incomplete)
16.	Agendas for meetings	1881-1904 (incomplete)
17.	Miscellaneous articles from the Transactions of the Yorkshire Naturalist Union	c.1879-1891
18.	Annual Reports and Balance Sheets	1895-1961 (incomplete)
19.	Notes of Hon. Sec. 1954/5 relating to sub-committee to report on organisation of Union into sections. Letters relating to publicity among affiliated societies.	1955
20.	Meteorological Reports	1882-96 (incomplete)
21.	Correspondence of Hon. Sec. including letters re Presidency	c.1955-60
22.	Lists of Members	1954 & 1958
23.	Letters relating to Centenary Meeting and Royal Patronage	1961
24.	Misc. letters relating to Finance and Publicity Sub-Committee	1958-9
25.	Letters and papers relating to conservation activities, e.g. Spurn Head, Grass Woods, tree felling, lime burning. Minutes of meeting of Executive	Dec. 1958
26.	Assorted Membership cards	c.1925-64
27.	Vertebrate Section Minute and Report Book	1876-1880
28.	Geology Section Report Book	1894
29.	Reports for Committee for Ornithology	1945 & 1949
30.	Minutes of Botanical Section Meeting	1959
31.	Wharfedale Naturalists Society Report	1955
32.	Whitby Naturalists Club Reports	1955-6
33.	Assorted Membership Cards	1950-64
34.	The London Catalogue of British Plants 11th edition	1925
35.	Unrelated loose article	

36.	Executive Minute Book	1902-1906
37.	Executive Minute Book 1906-1920 with numerous letters loose throughout book also copy of "British Association for the Advancement of Science" Hull. Handbook 1922	
38.	Book of proofs, reports, cards, notices, members cards and amounts ordered	1903-06
39.	Mammals, Amphibians, Reptiles, and Fishes Committee Minute Book Loose at front (2 pages) Vertebrate Section notes.	1920-1967
40.	Report Book - Beetles recorded on excursions of YNU	1877-1939
41.	Naturalist Stock Account Book	1884-1886
42.	Minute Book of Botanical Section	1877-1882
43.	Melvill Deweys 'Tables for Decimal Arrangement of Libraries' written in pencil (2 vols) n.d.	
44.	Library Stock List, returns, transfers, expenses, statements etc. Balance Sheet	31st March 1886-31st Dec. 1905
45.	Report Book – Various species – Terrestrial Mammalia, Marine Mammalia, Birds	1872-1883
46.	Report Book – from various districts: Frog Hall, Allerthorpe Common, Fyling Hall etc., Watercolour drawing <i>Enchelia</i> on page 234. Many Pen & Ink sketches. Newspaper cuttings. Photo H. M. Hallett. Sketch map at front. List of species at front in alphabetical order.	1892-1929
47.	Botanical Locality records of W. J. Fordham	1887-1908
48.	Report Book 1. South West Yorkshire Entomological Society. Journal & List of Coleoptera. Bubwith and district etc. Plans at front and back of book. Lanercost Priory and newspaper cuttings. Life History of <i>Heinerobius styma</i> – C. L. Withycombe. Numerous drawings, illustrations and plans and photos.	1905-1924
49.	Report Book 2. British Coleoptera. W.J.F. Journal and Index to collection of Coleoptera newspaper cuttings, drawings, maps. Article "Wild Life on a Yorkshire Moor" by Benjamin Hanley.	1910-1930
50.	Report Book 3. Coleoptera 1916. J. W. Carter. Coleoptera in coll. W.J.F. also "Insects of Hyeres" illus. "Table of Ptychoptera" Doncaster Lepidoptera & Hemiptera. H. H. Corbett, and copy letters from W. E. Sharp, B. S. Harwood, and others.	1896-1922
51.	Report Book – Trichoptera (named by G. T. Porritt, 13.10.1917) <i>Phrygavea striata</i> . Bubwith 1916. Lists, articles, cuttings,	1916-1925
52.	Notes on the topography, geology, zoology and botany of Knottingley Yorks and surrounding district. ("earthquake 17.12.1896 area affected 350 miles" note) notes, newspaper cuttings, drawings, clrd one of "Waxwing".	1894-9
53.	Diptera Localities. Diary 1931. Lists findings in various localities, Robin Hood's Bay, Fylinghall, Clyne Valley, Ross On Wye etc.	1924-31
54.	Diary 1925 W.J.F. Day to day account of Finds. Numerous Trichocera 24.1.25. Chart folded at front Mole's Nest Beetles in East Yorks. Various ills. coloured and b/w, pencil drawings and pressed specimens. Weather charts, also other notes and reports.	1925-8

55.	Diary 1931-4 William J. Fordham. Question sheets with answers loose in book. Index and list of letters at back. 2 watercolour drawings.	1931-4
56.	Schedules of Societies (loose schedule for 1906) Huddersfield Naturalist & Photographic Society.	1912-15
57.	Membership cards of various Societies and (1862-1888) Invitation cards. Incl. a parcel do. apparently belonging to Sopwith.	1879-92
58.	Letters for 1915-19. Wild Birds and Eggs Protection Committee	1915-19
59.	Letters relating to the Purchase of Soppitt Library June 1917 (further corres. 1972/3). Papers about Dent meeting Y.N.U. 1899-1900	
60.	Memoranda for Secretary's information: Transactions, MSS reports, binding colours, choice of Presidents etc.	1875-1945
61.	Cash Books – showing receipts and payments	1879-85
62.	Reference cards – Mammals showing species, location, when sighted, weight, date, etc.,	1907-34
63.	Folklore – Mammalia	1897-8
64.	Permian Lists, Mammalia – notes of W. D. Roebuck relating to the Staveley and Knaresborough, Kippax and Ledstone districts	1880
65.	Notes of various animals living and extinct, + newspaper cuttings.	1881-1901
66.	Mammals Committee – 36 envelopes containing notes diff. mammals – (5 on Bats) Wild Boar, Bank Vole, House Mouse etc. 1 envelope – Mammals report 1929-1930 other loose notes.	1882-1930
67.	Wm. Denison Roebucks – Botanical Section Minutes and Report Book 1899, 144th Meeting. Tadcaster.	10.6.1899
68.	Letters to Mrs. E. Hazelwood – Botany Mammals etc. – (controversy about an article by Mr. Hyde-Parker – 'The Naturalist', 1941) also Dr. Stuart Smith	
69.	Reference notes – Fish notes showing species where caught, date, length, weight, name of observer. e.g. Flounder one caught in R. Hull, Nr. Beverley Lock, 1899, J. R. Lowther	1884-1909
70.	Reference cards – Sea fish giving species where caught or observed, date, e.g. Pearlside 1914 taken in Scarborough S. Bay.	1882-1938
71.	Associates cards.	1960/1
72.	2 Letters from W. D. Roebuck, Kew 1938-9. Leaflet-article "Plant Gall records for 1948" by H. J. Burkhill 2 copies "Elms" by R. Melville, etc. 6 copies "Henry Thomas Soppitt".	1858-99
73.	"A list of British Diptera" by G. H. Verrall. 1888	
74.	2 copies – Lists of Members.	1958
75.	8 copies _ Jubilee of the Yorkshire Naturalists' Union Leaflets, n.d.	
76.	Leaflets (Transactions of the Y.N.U. specially offered to reduce stock). Leaflets – The Y.N.U. "Aims of the Society." Syllabus – S. West Yorks Entomological Society	1903 1941
77.	1 Copy 51st Annual Report for 1912 1 Copy 56th Annual Report for 1917 1 Copy 79th Annual Report for 1940	
78.	1 Leatherette case with cards – Reptiles & Batrachians giving species where sighted and date.	1913-34

79.	Receipts	1906-8
80.	Culpin correspondence	1905-8
	Various correspondence	1899-1907
	W. West's memoir by W. D. Roebuck	June 1914
	Charter correspondence	1910
	Hamer correspondence	1910
	Arnott correspondence	1903-11
	Letters to members of various Comm. re rules etc.	1910-11
81.	List of Yorkshire & Lincolnshire Birds	1902
	Y.N.U. Presidential address by W. D. Roebuck (2 copies)	1903
	Leaflet – British Association for the Advancement of Science	1917
82.	Botanical Section Correspondence	1876-9
83.	"A Catalogue of the recorded Coleoptera of the British Isles" by Sir Thomas Hudson Beare	1930
84.	Geological Section Minute Books with loose drawings at front	1891-2
85.	Geological Section Minute Book	1893
86.	Geological Section Minute Book	1895
87.	Geological Section Minute Book	1897
88.	Geological Section Minute Book, Section Rules etc.	1899
89.	Section B. Vertebrate – Zoology Minute Book	1891
90.	Section B. Vertebrate Minute Book	1895
91.	Section B. Vertebrate Minute Book	1896
92.	Vertebrate Section Minutes 143 Meeting	22.5.1899
	Vertebrate Section Minutes 144 Meeting	10.6.1899
	Vertebrate Section Minutes 145 Meeting	8.7.1899
93.	Section D Entomology Minute Book and Register	1891
94.	Entomological Section 1892 Minute Book	
95.	Entomological Section 1894 Minute Book	
96.	Entomological Section 1895 Minute Book	
97.	Entomological Section 1897 Minute Book	
98.	Entomological Section Minutes 143 Meeting	22.5.1899
	Entomological Section Minutes 145 Meeting	8.7.1899
99.	Cryptogamic Sub-section Minute Book	1892
100.	Cryptogamic Botany Section Minute Book	1894
101.	Section E. Div.2. Cryptogams (except Fungi) Minute Book	1895
102.	Bryology Section Minute Book	1896
103.	Bryology Committee Minutes and Reports 143 Meeting	22.5.1899
	Bryology Committee Minutes and Reports 145 Meeting	8.7.1899
104.	Section E. Botany Minute Book and Register	1891
105.	Section E. Botany Minutes 143 Meeting	22.5.1899
	Section E. Botany Minutes 145 Meeting	8.7.1899
106.	Coleoptera Committee Minutes 143 Meeting	22.5.1899
107.	Conchological Section Minute Book	1897
108.	Excursions and meetings for 1893 and minutes	
109.	Mammals etc., Committee Reports for 1912	

110. W. Denison Roebuck's notes on the smaller mammals – "Criticism of works on British Mammals" n.d.
111. 50 Notebooks & loose papers
Copy of T. Carter Jan 1.1875. "Natural History Calendar" – 49 lists of mammals, reptiles, amphibia, freshwater fishes also envelope – Marine Fish, + papers, letters, lists, notes. 1863-1883
112. Reference cards extinct British Mammals: *Strophodus* (Manchester Museum) and many others, also articles and authors listed on each card 1911-1935
113. Reference notes on British Mammals showing species, date, place, description 1882-1908
114. Reference cards – Freshwater Fishes showing species location when sighted, weight, date etc. 1906-24
115. Reference cards – Sea Mammals showing species, location when sighted, weight, date 1909-37
116. File – East Yorkshire Insects; Bubwith, Skipwith and Allerthorpe. Collected by W. J. Fordham and others 1911-37
117. File – Coleoptera; Allerthorpe & Barmby Moors. Numerous notes on sightings listed, also coloured leaflet inserted at front, Varieties of British Butterflies 1907-35
118. Certificate Y.N.U. to Life Membership of "The Yorkshire Naturalists' Trust Ltd." 30 Dec. 1946
119. Copy of "The London Catalogue of British Plants" Part 1 1886
120. Bundle of Papers: Libel Action, Walmesley -v- Y.N.U.
Corres. Y.N.U. excursion records: Scunthorpe 1910,
Scarborough 1909 and others.
Corres to W. Denison Roebuck 1891-1902
Report and letter from E. G. Bayford 1901
121. Bundle of Papers: Y.N.U.'s accounts 1906
Obituary notice William West
Membership proposals 1903-11
Minutes annual meeting of Cen. Comm.
Town Hall, Wakefield 17.10.1901
W. D. Roebuck's List of Subscribers 1903 etc.
Excursions 1908-9
122. Bundle – Soppitt Memorial: Receipt Book 1899-1902
Midland Bank Book 1899-1901
(Letter re Soppitt portrait 15.12.1903)
Paying-in book 1899-1901
Vouchers 1899-1903
Inventory of Books etc. taken before purchase. Note book, letters of condolence, etc. 1899
Book in German "Index of Desiderata"
123. H. T. Soppitt of Frizinghall. Plant Lists of Bradford District 1877-79, Revision of W. Yorks Uredineae. London Catalogue. Notes – 30 pages on *Pinus sylvestris*
124. Membership cards belonging to H. T. Soppitt 1881-98
125. Ring File – Christina Cheetham, Nutting Grove, Old Farnley, Leeds. List of Flora 1913

126. 4 copies "The London Catalogue of British Plants" 1886-95
127. Papers for Y.N.U. at Stokesley. Note book giving train time-tables in pencil. Telegram and letters to W. D. Roebuck 1899
128. List of Officers for various Districts + General correspondence 1877
129. Correspondence and forms for meetings at Bawtry and Brough 1901
Correspondence addressed to W. D. Roebuck 1902
130. 3 Pale Blue Notebooks – list Garden Fowls; list Beetles on plants; list Ichneumonidae, n.d.
131. Handwritten list "Westmoreland"
A) Macpherson H. A. – Vertebrate Fauna of Lakeland 1892
B) Boulenger G. A. – The Tailless Batrachians of Europe. Ray Society 1897
C) Leighton G. R. – The Life History of British Serpents and their local distribution in the British Isles 1901
132. Correspondence – W. G. Bramley, Bolton Percy notes – Vertebrate Zoology section. York district 1935. Reptiles 1935, also envelopes cont notes Reptiles, Batrachians where sighted and date.
133. Printed pamphlets, Yorkshire Naturalists at North Grimston (31) 1902.
Y.N.U. at Wykeham, Nr Scarborough 1901 (33). Y.N.U. at Bawtry 1902 (2 copies (38)) Y.N.U. AGM at Huddersfield 1893 (2 copies (40)) Y.N.U. at Withernsea 1892 (2 copies (41)). Y.N.U. at Ferrybridge 1895 (2 copies (45)) Y.N.U. in mid-Ribblesdale 1894 (2 copies (46)) Y.N.U. in Edlington & Wadsworth Woods 1891 (2 copies (49)). Yorks & Lancs Naturalists at Saddleworth 1888 (51) Y.N.U. on the Wolds 1891 (2 copies (56)).
134. Pamphlet "A Bird Watcher in Yorkshire" by Ralph Chislett 1948
135. 2 copies of the Rules of the Society. Invitation card Y.N.U. & Hull Scientific Societies meeting at Royal Institute, Albion Street, Hull. 20.11.1889
Typed – Submitted Resolutions. Y.N.U. Vertebrate Section 3 typed pages specifying reasons for producing a current history of the Birdlife of the County signed by Ralph Chislett, n.d.
136. Societies' List 1897
Corres. to E. Hawkesworth 1902
Leaflet Y.N.U. Winter Lecture Scheme 1901
Papers – British Assoc. for the Advancement of Science 1890
Baugh Fell notes, various letters to W.D.R. 1902
Doncaster, Cadeby etc Fungus Foray 1901
Askham Bog 1900
Packet of letters to W.D.R. 1899-1902
Presidential address to Y.N.U. by Sir Michael Foster Dec. 14.1898
137. Fox Hunting – Hounds: Newspaper cuttings and notes
Fox Hunting – Songs
Lists of Hounds. Folklore and bits of news about Foxes and Hunting 1875-82
138. Envelope – Notes and letters W. D. Roebuck, meeting at Sutton & Barnsley 1899
139. Envelope – Otter Hunting – newspaper cuttings and notes, letter re otters and otter hunting 1880-1900
140. Bundle – Misc. letters to W. D. Roebuck (one from J. R. Lane-Fox, visit to Bramham Park Estate) notes on animals, list of Freshwater Algae, printed articles – one by Wm. Nelson "To Whinmoor in Search of *Limnaea glabra*" Lists of Birds & Plants. Notes and newspaper cuttings

- re dogs, bloodhound trials, horses, truffle-hunting pigs, customs and folklore 1877-1900
141. 2 sepia photographs (Edw. Maule Cole, geologist) and letter dated 15.4.1897 re outing to Boston Spa + report Lees's report on excursion to Boston Spa, 19.4.1897
142. 8 invitation cards – The Jubilee of the Y.N.U. – The Heckmondwike Naturalist Society and the Spen Valley Literary & Scientific Society. 16.12.1911 50th Annual Meeting of the Y.N.U.
143. 12 Y.N.U. Voting papers – for ten members to be added to the General Committee 23.10.1899
144. Leaflet reprinted from – *The Entomologist's Record* Vol. 17, No. 11 – additions to our latest list of British Coleoptera by H. Willoughby Ellis
145. 2 Glass Negatives – Goose, Rat?
146. Protection of Birds Committee Minute Book (also envelope containing: Bird Protection Act Comm. misc. cuttings, reports etc. to be retained with minute book) 1906-54
147. Protection of Birds Acts. Government Acts and Protection Leaflets, i.e., notes and comments 1970 "The Problem of Pollution". 1964 Wild Birds "The Wild Birds (Fairburn Ings Sanctuary) order 1968. Poster Protection of Birds Act 1954, giving which birds may be shot. Wildfowl Trust leaflet, Slimbridge. R.S.P.B. Nature Trails, Shipstal, Arne. Firearms Act 1965 and others. 1954-70
148. Correspondence: The Royal Society for the Protection of Birds 1955-62
149. File: Protection of Birds Act Comm. Correspondence 1957-65
Copy of Firearms Act 1937
Correspondence: re Wildbirds (Eggs of Common Birds) order 1955
Shooting-gun Licences 1958-61
Armed Trespass Bill 1965
150. Bundle: Protection of Birds Act Comm. Correspondence 1965-66
List of Wardens willing to assist the Society 1966
Letters – re posters on Bird Protection; Sempton Correspondence; Protection of Birds Act 1954 and schedules; Leaflets. "The Use of Guns within the Law" School publicity poster 1963
151. Bundle: Protection of Birds Act Comm. Correspondence 1967
Protection of Birds Act Comm. list of names and addresses 1966
Leaflets "Use of guns within the law" and "Shooting Menace" and corres. with R.S.P.B. and Teessmouth; corres. re Pasture Masters Beverley; corres. Bempton Cliffs.
152. Bundle: Protection of Birds Act Comm. Correspondence 1968-9
Newsletter No. 10 Nov. 1969
Newsletter No. 9 May 1969
The Harewood Park Bird Report 1968
Corres. Robbing of Peregrine nests
Poster "Osprey" R.S.P.B.; 7 page typescript "The History of the Wild Birds Protection Act Comm. of the Y.N.U." Report "Fairburn Nature Reserve" December 1968, committee meetings etc. 1968-9
153. Envelope: Protection of Birds Act Comm. correspondence 1970
Report for 1970. Notes, comments and recommendations from M.R.S. Committee meetings, reports etc.

154.	Envelope: Protection of Birds Act Comm. correspondence Report for 1971 committee meetings, reports etc.	1971
155.	Envelope: Protection of Birds Act Comm. correspondence Report for 1971-2. Beached Birds survey. Committee meetings, reports etc. Humber Wildfowl Refuge, correspondence and report 1971-2	1972
156.	Envelope: Protection of Birds Act Comm. correspondence Newspaper cuttings, corres. with House of Commons – Firearms control. Humber Wildfowl Refuge Annual Report Angling Press release and replies	1973 1972-3
157.	Envelope: Protection of Birds Act Comm. correspondence Report for 1973-4; Humber Wildfowl Refuge Annual Report 1973-4; Newsletter 25 Sept. 1974; Habitat Digest Newsletter	1974
158.	Envelope: Protection of Birds Act Comm. correspondence Reports 1974-5 and 1976-7 Report Fungicides and Tilmire Golf Course, Nov. 1974 Report Pink footed Geese Fatalities, Humber Wildfowl Refuge, Jan. 1975 Humber Wildfowl Annual Report, 1975-6 Humber Wildfowl Annual Report, 1976-7 Poster Wild Birds: Protection of Birds Acts, 1954-76	1974-77
159.	Minute Book	1958-68
160.	Account Book	1957-71
161.	Account Book – Members' subscriptions	1972-82
162.	Correspondence – Allerthorpe Common. Hornsea etc. Ornithological Section recommendations, Edlington Wood. Copies of Yorks. Naturalists' Trust & Conservation Review, 1971. "The Tees Valley & Cleveland Water Board, Bird Watching Facilities and Regulations", 1972	1963-73
163.	Correspondence – Spurn Reserve – Future Policy; Nature Conservation on Urban Canals; Report on Edlington Wood; Hessle Chalk Quarry	1973-4
164.	Correspondence – Plant Gall new to Britain; Heritage Coast – Cloughton to Scalby; River Derwent Bill. Ornithological Committee minutes of various meetings	1973-4
165.	Correspondence – Loss of S.S.S.I. sites and further protection; Yorkshire Water Authority (River Derwent) Act 1976. Booklet, "The case for a Regional Airport for Yorkshire & Humberside". North Yorks and West Yorkshire County Structure. 2 sets reports.	1977-8
166.	Correspondence – River Derwent – Recreation Policy etc. West Yorks Structure Plan. Statement on participation, December 1978. "Problem of Oak Wilt" Disease. Thorpe Marsh Nature Reserve.	1978-9
167.	1) Painting of New British Fungi (with MS notes) 2) Offprint of article re above reprinted from <i>The Naturalist</i> January 1904 3) Painting of <i>Humaria phillipsii</i> 4) Offprint of "New and Rare British Fungi" reprinted from <i>The Naturalist</i> , January 1906	c.1904-6
168.	Minutes of Executive Committee meetings (incomplete) with correspondence	1971-81
169.	Minutes, correspondence and miscellaneous papers relating to Y.N.U. Entomological Survey Committee	1968-77

170.	Protection of Birds Committee, minute book	1956-86
171.	Ornithological Section, General Committee correspondence.	1976-90
172.	AGM Minute Book	1958-86
173.	Executive Committee Minutes	Dec. 1968-Dec. 1974
174.	Executive Committee Minutes	March 1978-Dec. 1983
175.	Loose agendas, typed minutes and attendance lists of Executive Committee	Dec. 1980-June 1983
176.	<i>Annual Report</i>	1972
177.	<i>Ornithological Reports</i>	1970-4, 1976
178.	<i>The Naturalist</i> . Nos. 951, 955 (4 copies), 972, 973	1979-85
179	<i>Bulletin</i> . (2 copies of no. 4)	1984-90

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Telephone: Leeds (0532-) 628339

Y.N.U. BRYOLOGICAL SECTION: ANNUAL REPORT 1990-1991

T. L. BLOCKEEL

9 Ashfurlong Close, Dore, Sheffield S17 3NN

Sectional meetings during 1990-1991 have been held as follows:

- | | |
|-------------|-------------------------------------|
| Spring 1990 | - Agden Dyke (VC 63), 31 March |
| Autumn 1990 | - Wharfedale (VC 64), 8 September |
| Spring 1991 | - Westerdale (VC 62), 27 April |
| Autumn 1991 | - Sedbergh (VC 65), 28-29 September |

These are reported in the *Bulletin* of the Yorkshire Naturalists Union.

RECORDS

Once again, rather few records have been made in the county. The list below includes all new vice-county records and other records of note. Recorders' initials: TLB = T. L. Blockeel; PCB = P. C. Bowes; CW = C. Wall. An asterisk indicates a new vice-county record or an amendment to the *Census Catalogue*.

Preissia quadrata: (63*) 44/52 On Magnesian Limestone, Spring Lodge Quarry, Cridling Stubbs, CW, Jan 1990; 44/51 On Magnesian Limestone crag, Brockadale, CW, Jun 1990.

Riccia cavernosa: (64) 44/27 Lumley Reservoir, near Grantley Hall, A. Henderson, Sep 1991, comm. A. Norris.

Riccardia palmata: (64*) 34/97 On rotting log, Step Gill, Buckden, CW, Jul 1990.

Leiocolea bantriensis: (62) 44/99 Calcareous flush, Hern Head, Wydale forest, R. C. Stern, Aug 1987.

Sphagnum girgensohnii: (63) 43/69 Seven Arches Carr, CW, Feb 1990.

Sphagnum recurvum var. *tenue*: (64*) 34/86 Weakly minerotrophic ground, edge of Malham Tarn Moss, M.O. Hill, Jul 1990.

Tortula ruralis: (63) 44/52 In small quantity on broken Magnesian Limestone, Spring Lodge Quarry, Cridling Stubbs, TLB, Nov 1991. Though common on the Carboniferous Limestone, *T. ruralis* is very rare on the Magnesian.

Tortula latifolia: (63) 44/61 Fishlake Church, CW, Feb 1990.

Aloina rigida: (63) 44/52 On soil on recently cleared, stony ground on Magnesian Limestone, Spring Lodge Quarry, Cridling Stubbs, TLB, Nov 1991. This appears now to be a very rare species in the county.

Gymnostomum calcareum: (63) 44/00 On base-rich grit rocks, Seal Bark, Saddleworth, TLB, Jun 1990.

Gymnostomum viridulum: (63*) 44/51 Soil on slabs of Magnesian Limestone on dry bank, Brockadale, TLB, Mar 1981; (64*) 44/42 Soft face of Magnesian Limestone outcrop in wood near Fairburn, TLB, Mar 1981; 44/44 Friable earth on shaded Magnesian Limestone bank, Wharfe Banks, Boston Spa, TLB, Jul 1983. Whitehouse & Crundwell (1991) have recently clarified the distinction between this little known species and *G. calcareum*. The occurrences on the Magnesian Limestone are the most northerly in Britain.

Ephemerum serratum var. *minutissimum*: (63) 43/38 On edge of path in woodland, Ecclesall Wood, Sheffield, TLB, Jan 1992.

Pohlia elongata ssp. *elongata* var. *elongata*: (63*) 44/00 At edge of base-rich grit rock, Seal Bark, Saddleworth, TLB, Jun 1990. This is very probably the exact location where *Pohlia elongata* was collected by William Wilson in an excursion with Jethro Tinker in 1832 (Cash, 1887). Since that time, the surrounding moorland has become severely degraded, but a very interesting flora survives in one spot on small outcrops of base-enriched grit.

Mnium marginatum: (63) 44/00 On base-rich grit, Seal Bark, Saddleworth, TLB, Jun 1990.

Breutelia chrysocoma: (62) 44/89 Thack Sike, Levisham high Moor, PCB, Oct 1990. Welcome confirmation of the continued occurrence of this Atlantic species in NE Yorkshire.

Zygodon conoideus: (63) 44/00 On base-rich grit, Seal Bark, Saddleworth, TLB, Jun 1990.

Orthotrichum cupulatum: (63) 44/61 Fishlake Church, CW, Feb 1990.

Orthotrichum stramineum: (63*) 44/32 On *Salix* in small quantity, Stanley Marsh, near Wakefield, TLB, May 1990. The occurrence in the West Yorkshire conurbation of this and *Ulota crispa*, both pollution-sensitive epiphytes, is most unexpected.

Ulota crispa s.l.: (63) 44/32 On *Salix* in small quantity, and without mature capsules, Stanley Marsh, near Wakefield, TLB, May 1990.

Homalothecium lutescens: (63) 44/52 On Magnesian Limestone, Spring Lodge Quarry, Cridling Stubbs, CW, Feb 1990.

Cirriphyllum piliferum: (63) 44/51 Edge of woodland, Went Valley, TLB, Mar 1990.

Orthothecium intricatum: (63) 44/00 On base-rich grit, Seal Bark, Saddleworth Moor, TLB, Jun 1990.

THE RACOMITRIUM HETEROSTICHUM GROUP IN YORKSHIRE

Following the revision of this difficult group in the northern hemisphere by Frisvoll (1988), I have revised a substantial amount of British material in order to establish an accurate vice-county distribution (Blockeel, 1991). *Racomitrium sudeticum* is the least common species of the group in Yorkshire, being nearly confined to the high ground of the north and northwest. Its occurrence on Saddleworth Moor is therefore of special interest; this is the only site known at present in the South Pennines. *R. sudeticum* is the plant described as *R. affine* in Smith (1978). The true *R. affine* is very close to *R. heterostichum*, and both species are widely spread in the western half of the county. No specimens have yet been confirmed for NE Yorkshire, but there are a number of field and literature records for the aggregate species there. A list of confirmed records for the county follows.

R. sudeticum (Funck) B. & S.:

(63) 44/00 Grit rock face, Seal Bark Rocks, Saddleworth, T. L. Blockeel, Oct 1980 (Hb. Blockeel).

(64) 34/77 Ingleborough, J. A. Wheldon, May 1890 (NMW) and Jun 1890 (NMW); 34/87 Pen-y-ghent, C. A. Cheetham, n.d. (NMW); 34/77 Ingleborough, C. A. Cheetham, n.d. (NMW); 34/77 Ingleborough, A. S., 10 Apr 1925 (BBSUK); 34/77 Ingleborough, A. Sutton, 10 Apr 1926 (NMW); 34/87 Boulder below grit scree, Pen-y-ghent, T. L. Blockeel, Aug 1981 (Hb. Blockeel).

(65) 35/82 Cronkley Fell, E. C. Horrell, Aug 1898 (NMW); 35/82 Cronkley Scar, Teesdale, M. C. F. Proctor, 24 May 1952 (MCFP); 35/82 Near High Force, Teesdale, L. B. C. Trotter, 18 Sep 1958 (NMW); 34/69 On boulder on bank of stream, Carlin Gill, near Black Force, Howgill Fells, 300 m alt., T. L. Blockeel, Sept 1991 (Hb. Blockeel).

R. affine (Schleich.) Lindb.:

(63) 43/28 Wall top, Rivelin, T. L. Blockeel, Apr 1980 (Hb. Blockeel); 43/19 On grit boulder, nr. Stainery Clough, Upper Derwent Valley, T. L. Blockeel, Mar 1988 (Hb. Blockeel)

(64) 34/67 Ingleton, J. A. Wheldon, 13 Jul 1895 (NMW); 34/95 Grit boulder, Waterfall Gill, Embsay Moor, T. L. Blockeel, Aug 1981 (Hb. Blockeel).

(65) 34/69 On rock face in ravine by waterfall, 300 m alt., Cautley Spout, c. 6km NE of Sedbergh 34/68.97, T. L. Blockeel, Sept 1991 (Hb. Blockeel); 34/69 On boulder on banks of stream, 300 m alt., Carlin Gill, near Black Force, Howgill Fells 34/64.99., T. L. Blockeel, Sept 1991 (Hb. Blockeel)

R. heterostichum (Hedw.) Brid. (incl. *R. obtusum* (Brid.) Brid.):

- (63) 34/92 Millstone grit wall, north of Hebden Bridge, T. L. Blockeel, Jun 1977 (Hb. TLB); 43/29 On millstone grit boulder in oak woodland, Agden Dyke, Bradfield 43/24.93., T. L. Blockeel 19/036, Mar 1990 (Hb. TLB).
- (64) 34/67 Ingleton, J. A. Wheldon, May 1890 (NMW); 34/87 Pen-y-ghent, J. Appleyard, Aug 1947 (NMW); 34/67 Walls, Oddies Lane, above Mealbank, Ingleton, G. W. Garlick, 6 Apr 1956 (NMW); 34/67 On stones, Kingsdale Head, Ingleton, G. W. Garlick, 6 Apr 1956 (NMW); 44/17 Grit wall, Lofthouse, Nidderdale, T. L. Blockeel, Nov 1983 (Hb. TLB); 34/77 On rock face in old quarry in ravine, Twistleton Glen, Ingleton, T. L. Blockeel, Oct 1991 (Hb. TLB).
- (65) 35/82 Cronkley Fell, Upper Teesdale, H. N. Dixon, Aug 1896 (NMW).

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OBITUARY

WILLIAM ARTHUR SLEDGE

(1904-1991)

Arthur Sledge was a Leodiensian. He was born in Leeds on 14th February 1904 and died in Leeds on 15th December 1991, having lived there all his life. He was educated at Leeds Grammar School and graduated from the Botany department of Leeds University in 1926. He gained his Ph.D. in 1928, when he joined the staff of the department as a Demonstrator. He was appointed as a Lecturer a year later and eventually became a Senior Lecturer. After his official retirement in 1969 he retained a room in the department and continued his work there as Honorary Research Fellow, usually walking the two miles from his home in Headingley. A severe heart attack two years ago restricted his physical activities but he bore the resulting debilities uncomplainingly and with fortitude.

His interest in botany was triggered at his junior school by a pressed flower competition, which, of course, he won. Some time later he realised that the master designated to judge the competition could only have been one step ahead, since all crucifers, umbellifers and composites were banned from the competition and grasses, sedges and rushes were not considered to have proper flowers. While he was out collecting specimens, his vasculum was spotted by Frank Palmer who was taking part in a similar senior school competition. Frank and his father subsequently introduced the young Sledge to the joys of botanising on the Permian Magnesian Limestones a few miles east of Leeds. From this was born an awareness of habitat and an interest in ecology and he was later to become a founder member and council member of the Yorkshire Naturalists' Trust (now the Yorkshire Wildlife Trust).

Whilst still in his early teens, he had found F. A. Lees' *Flora of West Yorkshire* (1888) in the library and, learning that Dr Lees lived quite nearby, he became a frequent visitor to his home, armed with a vasculum of plants for identification and eggs from his mother's hens. In 1941, *A Supplement to the Yorkshire Floras by the Late F. Arnold Lees*, edited by C. A. Cheetham and W. A. Sledge, was published.

In 1920 he was introduced to Leeds Naturalists' Club by the blind botanist, John Wilkinson. He joined about the same time as two protégés of Digby Firth, Douglas Hincks and Basil Kitchen, who later became first class naturalists themselves. Active members of the club at that time, who all helped to further Arthur Sledge's interest, included such famous names as J. H. Priestley, Professor of Botany at Leeds; W. H. Pearsall, Edward Percival, R. W. Butcher, the bryologist W. H. Burrell and an excellent all-round naturalist, E. C. Horrell.

It was standard practice at the Leeds Naturalists' Club to report on Yorkshire Naturalists' Union meetings and Arthur Sledge was inspired to join the Union. The most knowledgeable naturalists in the county belonged to the Union and from them much was gleaned. Later he more than repaid what he had gained. In the field he was the ultimate authority who could be relied upon to give a correct identification to all but the most esoteric of critical plants, along with interesting comments on habitat and plant associations. His memory for sites of interest was unfailing, even those he had not visited for forty years and, when he felt there was good reason to give directions to them, these directions were precise and accurate. All of us were in awe of him, but those who showed an intelligent interest and desire for knowledge were subsequently greeted with a warm smile and questions were answered fully, with quiet enthusiasm. In addition to sharing his expertise in the field, Dr Sledge edited the Union's scientific publication, *The Naturalist*, for thirty-two years, from 1943-1975. His dedication and skill resulted in *The Naturalist* being read and respected nationally and internationally, and, in spite of his modest and unassuming manner, his pride in it and his paternalism towards it were evident.

He joined the BSBI in 1924 and was appointed recorder for south-east, south-west and mid-west Yorkshire in 1949. He relinquished south-east Yorkshire to Eva Crackles in 1969 and continued with south-west and mid-west until 1987. In 1987 he was made an honorary member of the Society for his "long and valuable service to Yorkshire botany and to the Society as Recorder and Editor". He had edited the *Distributor's Report (Exchange Section)*, a supplement to the Year Book, in the late 1940s.

Dr Sledge was very much a Yorkshireman but he was by no means parochial. During his undergraduate days, much of his travel outside the "Broad Acres" was by bicycle, accompanied by R. W. Butcher. This included visits to East Anglia, the Gower, the Avon Gorge and Dorset in search of their special plants. In those days specimens were picked and contributed to Dr Sledge's enormous and excellent herbarium. The British sheets were donated several years ago to the Bradford Museums Service and they now reside in Cartwright Hall Museum along with those of Lees. The foreign material is widely distributed internationally.

Arthur Sledge was one of the lucky ones, able to combine his interest with his career. His first publication was a contribution to the report of the British Association meeting which was held in Leeds in 1927, for which he wrote sections on the flora of Fountains Abbey, Nidderdale, Malham and Wharfedale. This was followed a year later by his Ph.D. thesis on the rooting of woody cuttings. He travelled widely in Europe and, for research purposes, visited New Zealand, Madeira, Sri Lanka (then Ceylon) and Samoa. His work was concerned mainly with the systematics of Botany and, following his first visit to Sri Lanka, he untangled the difficult taxonomy of the native ferns. His paper, written in association with Professor Irene Manton, entitled *Observations on the Cytology and Taxonomy of the Pteridophyte Flora of Ceylon* (1954) remains a classic. Other papers on the taxonomy of tropical ferns followed, as well as numerous articles on aspects of the Yorkshire flora. All this work was carried out with meticulous care and his clear systematic presentation made him a first-class teacher. Even during his period of ill-health Dr Sledge

continued to work. He had recently completed an excellent historical review for the forthcoming West Yorkshire Plant Atlas, to be published by the West Yorkshire Ecological Advisory Service and he was still collaborating with Professor R. E. Schultes, formerly of Harvard University: they shared a deep respect for Richard Spruce, pioneer botanist in the Amazon and Andean regions, and were instrumental in having a commemorative plaque put on the cottage in the Castle Howard estate where Spruce had lived.

We in Yorkshire have lost our most outstanding botanist, and one of the best in Britain, and we mourn along with Marjorie, his wife, who has supported him wonderfully since their marriage in 1939. We offer sympathy to Mrs Sledge and to her son, Christopher, and his family.

P. P. Abbott

[For a portrait of Dr Sledge, see *The Naturalist* 101: 1 (1976).]

BOOK REVIEWS

The African Elephant. Twilight in Eden by Roger L. DiSilvestro. Pp. xxiii + 206, with numerous colour plates. John Wiley, New York, 1991. \$34.95.

As is widely appreciated the African Elephant has in recent times suffered severe depredations in numbers from a variety of causes particularly changed land use, conflicts and poaching. This book attempts to place this in perspective by describing the natural history of the elephant and at the same time drawing a picture of the historical development up to the present of man's relationship with this species. It starts with early history which includes the use in war of elephants by the Greeks, Mongols, Egyptians, Romans and Carthaginians. A fairly brisk jump in time takes us to their appearance in zoos and circuses in the 19th Century in Europe and America.

The following chapter looks at elephants in the field from two aspects. Those of elephant hunters and explorers in Africa south of the Sahara and those of the contemporary tourist. This chapter exemplifies one of the main shortcomings of the text namely lack of balance with the inclusion of the irrelevant at the cost of much that would be of interest to the general reader. Thus while a few hunters are mentioned often notable elephant hunters such as W. D. M. "Karamoja" Bell and more recently E. Temple-Perkins are omitted. On the other hand considerable space is devoted to describing Theodore Roosevelt's safari although relatively little of this was devoted to elephant hunting. And why in a book about elephants is the text of pages 58-60 devoted to a boring list of timings of visitors to a lioness in Amboseli Park?

Things get even worse in the third chapter on "The Hidden World of the African Elephant" which presumably attempts to describe its natural history. In the first section Laws outstanding pioneer research is greatly under-represented and to state that this "failed to provide much information on elephant social behaviour and ecology" is grossly inaccurate. It was Laws who correctly predicted the mass mortality through drought in Tsavo Park, who related reproductive frequency to population density and who described elephant ranges and group sizes. A long section on post-embryonic development describes behavioural and development. While this of undoubtedly interest the lay reader would probably also like to know something of the diet, activity, population density and favoured habitats of the elephant all of which would make a useful prelude to the next section on management. The section on elephant culls is hardly a detached account of the pros and cons of culling with, for example little attention given to the self-inflicted damage elephants can do by degrading their habitat.

The final chapter "Africa fights to Save its Elephants" is by far the best in the book. This is an up-to-date account of the now largely defunct markets in ivory, poaching control measures in the 1980s (particularly in Kenya), trade bans and their economic consequences.

Here the reader is given a lucid insight into how the beneficial effects of trade bans depress the price of ivory and with it the incentive to poach. While in some countries there is at present cause of optimism one still wonders how well the elephant is surviving across much of its tropical range; but of this we are not advised.

There are numerous superb colour photographs by Page Chichester which do much to illuminate and enhance the text. Overall, the text is a disappointing, poorly balanced account which does little credit to the book's sponsors – the National Andubon Society.

MJB

Fishes of the Great Barrier Reef and Coral Sea by John E. Randall, Gerald R. Allen and Roger C. Steene. Pp. 507, with over 1,000 full colour illustrations. University of Hawaii Press, Honolulu, 1990. £40.00.

This lavishly illustrated book is intended to provide for the identification of the 1,111 species of fish found in the Great Barrier Reef and adjoining reefs of the Coral Sea. The Coral Sea covers an area to the North-east of Queensland, and includes the seas around the Solomon Islands, Vanuatu and New Caledonia. This small area of the Pacific Ocean holds one of the world's richest marine habitats, with more than 90 per cent of the region's reef fishes being recorded from the Coral Sea.

The authors have used the technical advances of underwater photography to great advantage with the result that many of the photographs are quite stunning. Some, however, suffer from a lack of direct light, which gives many of the photographs a bluish cast, the result of sun rays being filtered out by the sea-water. The volume also contains seven plates: these are full page colour illustrations. The plates illustrate, in the main, oceanic or deep water fish such as Sharks, Tunas and Mackerels, and are specifically included for the use of deep sea anglers.

This book truly exemplifies the use of colour photography for the recording of plants and animals. A close comparison of the colour illustrations with the colour photographs does, however, show that a good illustration is nearly always better than a photograph. Ideally, both good photographs and good colour illustrations are needed if books are to be used for the identification of groups of animals such as fish.

With the recent growth in overseas tourism to Australia (and the Great Barrier Reef in particular), the book has been written to try and catch the maximum market of laymen, divers, anglers, underwater naturalists and professional biologists. The authors have attempted a very delicate balancing act between the production of a scientific publication and a coffee-table book. On balance, this tactic does seem to have worked, and I have little doubt that this book will find its way into the libraries of all those people, both professional and otherwise, who are interested in the identification of fish, and in the seas in which they can be found.

AN

The Development and Evolution of Butterfly Wing Patterns by H. Frederik Nijhout. Pp. 297. Smithsonian Institution Press, Washington & London, 1991. £15.50

A model sometimes discussed in developmental biology is known as the French flag problem. The problem is to create a pattern of three distinct bands given a wave of information passing from one side, with a degree location-specific interpretation of the instructions. The solution is of general relevance in development, but given their shape, their growth from one end and the variety of patterns achieved, butterfly wings are almost diagrammatic realizations of models such as these. Moreover, the patterns themselves are sometimes manifestly adaptive. They may provide camouflage, warning patches of colour, mimetic patterns or eye spots, which in turn may be alarming or diversionary. The

significance of the pattern can be readily understood, and clues to the mechanism generating it may be discerned. The butterfly wing allows us to experience both the picture and the methods of the artist.

Nijhout is a major investigator of the interplay of production and adaptive value of Lepidopteran wing patterns. This book reviews the subject, with particular emphasis on his own work, and discusses the problems to be solved. The account starts with a description of the morphology of wings, the structure of scales, structural coloration and the chemistry of the pigments. Naturalists look for pattern, both literally and figuratively, and one of the starting points to a study of butterfly wings would be to decide whether their great variety could be resolved into one or a few ground plans or archetypes. The author discusses the remarkably similar descriptions of a ground plan which were produced independently in the 1920's by Schwanwitsch and Süffert. At one point Nijhout was disinclined to follow them. Later he decided that they had got it right: all butterfly wing patterns could be resolved into a single basic scheme, provided some additional features are included. One important modification of the original picture is the realization of the extent to which pattern formation in different parts of the wings of the same insect may be independent. The ground plan and its manifold variants are described.

Having got a general picture, what then? Recent research has featured experimental manipulation to understand the developmental processes and genetical studies, especially of the control of mimetic patterns. The latter naturally leads to study of patterns as adaptations. These subjects are considered in turn; the literature is reviewed and a general model for pattern formation involving diffusion kinetics is presented.

This is a fascinating and informative book which may be recommended to anyone as a comprehensive and up-to-date account of butterfly wing patterns. At another level it is also written for the expert, being one of a Smithsonian series of studies in comparative evolutionary biology. Dispute in this field broadly concerns the relative importance of developmental constraint and selection for evolutionary novelty. Nijhout is impressed by the archetype and so by the constraint, at least in the short term. In the long term the system is not constrained, but it may not show continuous change either. The author argues from the properties of the generative models that large scale jumps may have played their part in the evolution of the group. Others will disagree with this interpretation, but that way the subject develops. The book ends with a classification of butterflies, and in particular, a new classification of the Nymphalidae by Donald J. Harvey and references to alternative schemes. The publishers are to be congratulated on the production of this handsome volume.

LMC

Provisional Atlas of the Larger Brachycera (Diptera) of Britain and Ireland by C. M. Drake. Pp. 132, with 63 maps & 1 table. Institute of Terrestrial Ecology, Monk's Wood Experimental Station, Huntingdon, 1990.

This latest Atlas of British Diptera covers the 152 known British members of the brachycerous families Stratiomyidae, Xylomyiidae, Xylophagidae, Rhagionidae, Tabanidae, Asilidae, Therevidae, Scenopinidae, Acroceridae and Bombyliidae. The collective name "Larger Brachycera" refers to the spectacular size and appearance of the larger species, but this convenience-name belies the fact that its smallest members are dwarfed by the largest members of such "Smaller Brachycera" as the Empididae and Dolichopodidae.

The publication contains distribution maps of 62 species and a table of all of the known British species arranged under Watsonian Vice-County numbers. In addition, summarised distribution ranges, flight periods and habitats are also included. The author, who is to be congratulated on the clarity and conciseness of his work, stresses that this Atlas is very provisional, resulting from 20,984 records.

Like other such publications this is as instructive for the negative as for the positive records. Absence of records for a species from a particular square often indicates a mere lack of recording, but the general coverage maps reveal unrecorded or relatively underworked areas. So absence from the best-worked squares but presence elsewhere becomes highly meaningful. Despite the provisional nature of the work it is very clear that our bulkiest fly *Tabanus sudeticus* is seriously under threat in southern and eastern England – hardly surprising for a denizen of wet heaths and bogs. The predominance of old records further underlines decline in these areas. The equally spectacular *Asilus crabroniformis* appears to be contracting south-westwards, probably in response to widespread destruction of heaths and dry pastures further east.

Armed with this book, dipterists can now plan their summer holidays to unrecorded areas. Scanning through the data they will see that many of their existing records have not been included and this will hopefully prompt them to rectify the omissions.

A few published records, such as *Chloromyia formosa* in the Outer Hebrides, have been missed, and a very few minor errors have inevitably crept in. Thus *Solva varia* appears under the name *S. solva* in the Vice-County table. These however do not detract from the great value of the book and we hope that it will precipitate a massive flood of data for the next edition.

PS

Small Wonder, A New Approach to Understanding Nature by Mari Friend. Foreword by David Bellamy. Pp. 160, with 80 colour and 20 line illustrations. Blandford Press, 1991. £14.95

The 1990's are much-heralded as an ecology-conscious decade. This book is claimed to be "an ecology book for everyone". The author, Mari Friend, has a long-held interest in promoting the pleasures and secrets of the wildlife to be found in our everyday surroundings. Ten years ago, she founded a countryside centre behind her home in Shipley Glen where she introduced many children to natural history in the wildlife room and garden. Although she has now moved to the Peak District, the centre at Bracken Hall was sufficiently valued by the local community to ensure its continued management under the auspices of the hard-pressed local authority, Bradford MDC.

This book draws heavily on her experiences of running Bracken Hall and is a mixture of autobiographical anecdotes and factual information. Printed to a high quality, the book is liberally illustrated by the author with countless drawings of a charmingly naive quality.

The content covers broad topics linked to habitat zones eg., Gardening for Wildlife, Hedgerow Ecology, and Beachcombing. Almost all of the subject matter is the bread and butter of junior and middle school natural history. In an already overcrowded schools' publishing market, I am not sure that this publication will fill a unique niche. The language is too advanced for children, but the book may prove useful to parents with no background knowledge in answering their children's questions on common countryside phenomena.

A major reservation is the encouragement given throughout to keeping specimens in captivity in containers such as jam jars and longer-term aquaria. There are even instructions for pitfall traps. Although the author does give practical advice to assist survival, as well as making reference to the Wildlife and Countryside Act 1981, it is my experience that the vast majority of creatures die under such circumstances. Indeed, collection of spawn has not helped the sharp decline in numbers of frogs.

This book almost seems to be a modern, "green" version of "The Country Diary of an Edwardian Lady". It may prove attractive enough in appearance to sell as a gift from non-naturalists to other families of non-naturalists.

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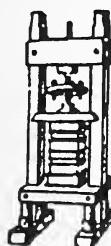
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42

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853



The Backhouse Trichomanes — *D. A. Ratcliffe*

James Backhouse Jnr (1825-1890) and the Killarney Fern —
Frank Horsman

**The ecology of Long-eared Owls wintering in south west
Yorkshire** — *Jeff Lunn*

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THE BACKHOUSE TRICHOMANES

D. A. RATCLIFFE

Rumsey *et al.* (1991) have given us a fascinating account of the occurrence of gametophytes of *Trichomanes speciosum* in Yorkshire. How unfortunate, then, is their criticism of one of the most distinguished and respected of Yorkshire botanists, James Backhouse, whose Welsh records of the native sporophytes of this species they question. There were three generations of James Backhouse, but it is with the middle one that the Welsh records of *Trichomanes* are particularly connected. The obituary of this James Backhouse (1825-1890) by Hanbury (1890) mentions three finds of the Killarney Fern in Wales. In a letter to J. D. Hooker, dated 26 January 1864 (Kew MSS), Backhouse says that "after 5 weeks of most patient seeking, my father and I found a fine *wild* habitat for *Trichomanes radicans* in North Wales last autumn. The plant was more luxuriant than any I ever saw or heard of from south west Ireland!" Backhouse junior's herbarium material, in the Royal Botanic Garden, Edinburgh, and elsewhere, shows this last statement to be hardly an exaggeration; and one sheet bears the comment "certainly wild". They found several fertile fronds in this colony.

It is less certain that the two Backhouses were the first discoverers of this magnificent colony, as they evidently believed themselves to be. *Trichomanes* had been found in Snowdonia earlier in 1863 by J. F. Rowbotham, and the description of the habitat and plant by Moore (1863), and the appearance of the surviving frond given to Moore (in Herbarium of the Natural History Museum), suggest that the two records referred to the same locality in vc 49. Its whereabouts was a closely guarded secret, and despite long and careful search, this colony has not been re-found. Indeed, it seems never to have been seen during the present century, and it could have ceased to exist long ago.

The younger Backhouse went on to discover at least 3 other separate colonies of *Trichomanes* in Wales, and Hanbury indicates that he returned repeatedly in his persistent searches: "In North Wales, too, so careful was his search for the Killarney Fern that over many miles of country his knowledge extended to every stream". Other records and specimens make it clear that other members of his related circle of friends were shown or told of the additional localities. One of these was evidently the well known Merioneth colony finally exterminated by collecting in the 1960s (Roberts, 1979).

It is certainly true that the Backhouses collected living filmy ferns from around the world, and were said to have perhaps the finest known collection of these plants in their underground fern-house in the York nurseries. They took Welsh and Irish *Trichomanes speciosum* into cultivation, and material still growing in the Edinburgh and Cambridge Botanic Gardens is said to be of their Welsh provenance (D. Henderson, H. J. B. Birks, *pers comm.*). Despite past assertions that doubt attaches to the status of several finds of *Trichomanes* sporophytes in Britain, and whatever the fate of the Backhouse Welsh colonies, there is no reason to question that their finds in Wales were of genuinely native populations. They were people of the highest integrity, held in great esteem by their contemporaries, and were responsible for discovering several of the most celebrated of the Upper Teesdale rarities (Horsman, 1990). Roberts (1979) has discussed the statements that other botanists planted this fern in Wales; but if they did so, none of these introductions is known to have survived, as far as I am aware.

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JAMES BACKHOUSE JNR (1825-1890) AND THE KILLARNEY FERN*

FRANK HORSMAN
7 Fox Wood Walk, Leeds, LS8 3BP

In the course of describing their intriguing discoveries of thriving gametophyte populations of the Killarney Fern *Trichomanes speciosum* Willd., within vice-counties 63 and 64, Rumsey *et al.* (1991) comment on the link between the name of James Backhouse Jnr and early discoveries of *Trichomanes* in mainland Britain: 'As a nurseryman, Backhouse would have had access to Irish material and his finds have thus been treated with some suspicion.' An examination of the evidence, however, leaves little doubt of the validity of his finds.

The following note appeared in the final issue of *The Phytologist* published in July, 1863:

TRICHOMANES RADICANS IN WALES?

"The Trichomanes radicans [*T. speciosum*], better known as the Killarney Fern, was found last week in North Wales by Mr. J. F. Rowbotham, a member of the Manchester Field Naturalists' Society. This interesting Fern has not been found in Great Britain, except in some portions of the lake district of Ireland, since the year 1782, when it was found at Bingley, in Yorkshire."

I forward the above extract from one of our Norwich papers of Wednesday last. Do you know anything about the fact of the Fern having been discovered in North Wales, and also whereabout (sic)? If so, you will oblige.

A. M. GIBSON

Norwich

Backhouse Jnr wrote numerous papers for *The Phytologist* (Hanbury 1890). There can be little doubt that he read Gibson's note.

Further, Moore (1863) wrote:

"I understand from Mr J. F. Rowbotham, of Manchester, that he has more recently found Trichomanes in N. Wales, in a part of the Snowdon range. The fronds were abundant and remarkably fine; one of them is quite equal to the bulk of Irish specimens in luxuriance of development, the frond having the broad or triangular-ovate outline of the more perfect examples of this fern, and measuring about 7" across the widest part, and nearly 10" in length in addition to a stipe of 8" long. The frond is not fertile. Another frond in Mr Rowbotham's possession is rather larger, having a total length of about twenty-two inches. "I found it," he writes, "in a large hole formed by fallen rocks alongside a cascade of water; and admission to this hole, which is about 5' high by 4' wide, is obstructed after a depth of about 3' by the fern falling from the rocks at the top and growing out of the sides in the form of a beautiful curtain, down which the water is constantly trickling, the whole having much the appearance of a crystal screen." What a treat to a fern seeker, to stumble on such a sight as this!"

The botanical field work of Backhouse Jnr was inextricably wound up with that of his father, James Backhouse Snr (1794-1869) during the period 1842-1869 (Baker 1869, Hanbury 1890, Horsman 1990). Backhouse Snr had returned in 1841 from a ten year absence in Australia, Mauritius and South Africa where he had been a Quaker missionary (Davis 1989). Backhouse Jnr was himself a Minister in the Society of Friends (C. J. Smith, *pers comm.*).

*Dedicated to the late W. Arthur Sledge who admired the Backhouses.

Having read Gibson's note of July 1863 in *The Phytologist*, and/or T. Moore's note in *Journal of Botany*, it is hardly surprising that Backhouse Snr and Jnr should set off for Wales as soon as possible in search of *T. Speciosum*. On 26 January 1864 Backhouse Jnr wrote from York to Sir Joseph D. Hooker, then assistant to his father, Sir William J. Hooker, who was Director at Kew and a life-long associate of Backhouse Snr (Horsman 1990):

"It gives me pleasure to hear of Sir W. J. Hooker's health being better. He will be interested in knowing that after 5 weeks most patient seeking, my father and I found a fine wild habitat for *Trichomanes radicans* in North Wales last autumn. The plant was more luxuriant than any I ever saw or heard of from South West Ireland! It proves perfectly hardy – at least our plants (from Ireland & Wales) have been frozen into massive icicles for 2 to 3 weeks without an hour's respite."¹

On 30 January 1864 he wrote to Hooker again:

"I send by passenger train today a spec^{n.} of *Trichomanes radicans* from Wales for Sir W. J. Hooker's acceptance – much wishing that it were a better one, but we did not like to take many and only found very old and shattered fronds fertile (or portions of partially decomposed fronds,) one of which I send . . ."²

Backhouse(1864) presented specimens of *T. radicans* to the Royal Botanic Garden, Edinburgh in February 1864, with the following note:

"I have much pleasure in forwarding herewith specimens of *T. radicans* found by my father and myself in a truly wild state in Carnarvonshire. The plant was remarkably luxuriant."

His specimens in EDIN (10 sheets) are labelled "certainly wild". "Discovered and gathered by J. Backhouse Snr & Jnr. 7.10.1863" (H. J. B. Birks *pers. comm.*).

Hanbury (1890) summarises an untraced manuscript written by Backhouse Jnr 'which gives in a rough chronological order the dates of their (Backhouse, father and son) journeys either alone or together, and the more important botanical discoveries which they made'. Hanbury's summary states that in 1863 'a great hunt was made for *Trichomanes radicans* Sw.' in North Wales. Backhouse Snr's last visit to Wales was made in June 1865 (Horsman 1990). 'In 1869, *Trichomanes radicans* Sw. was gathered in Wales . . . Wales was again visited in 1871, when "two fresh patches of *Trichomanes* in . . . station with T. [Thomas] Westcombe and Theodore [Crosfield]" were found'. Backhouse Jnr's searches for *Trichomanes* in North Wales were so intensive that Hanbury (1890) notes "so careful was his search for the Killarney Fern that over many miles of country his knowledge extends to every stream."

Thus, there would appear to be no doubt that the Backhouses found the Killarney Fern growing wild in North Wales. It is suggested that if they found it in North Wales, it is not unreasonable to assume that Backhouse Jnr's knowledge of a single extant site in the West Riding of Yorkshire in no less credible. The record in Lees (1888) reads 'D. or T. ("Don with Dearne" or "Trent tributaries"). Still in one station in the West Riding; James Backhouse in litt. I cannot more precisely indicate the locality.' Lees (1888) does not state that Backhouse found this station. Apparently Backhouse Jnr did not specify the site to Lees (1888) as Lees did not know within which river-basin district the site was to be found. Two relevant letters from Backhouse Jnr have been located by the author: one in reply to F. Arnold Lees, and the other, in the author's opinion, also in reply to Lees.³ Both suggest that Backhouse Jnr and Lees did not enjoy the most cordial of relationships.

H. J. B. Birks and D. A. Ratcliffe (*pers. comm.*) have made a special study of Backhouse Jnr's fern finds. Birks comments (27 November 1991) 'Concerning the finds of *Trichomanes* by James Backhouse, I do not regard them with any suspicion at all. I am sure they are all totally reliable. Backhouse had, however, the vision not to disclose the localities, thereby protecting the plants from collecting and extermination. Thus although the localities are vague I am sure that Backhouse made them vague to protect the plant from collectors.'

Roberts (1979) reviewed the Killarney Fern in Wales. R. H. Roberts (*pers. comm.*)

remarks 'I did not intend to imply that Backhouse Jnr may have made some introductions of the Killarney Fern in North Wales. I think that my references to plantings are clear enough . . .'

Some confusion apparently surrounds an introduction of the Killarney Fern which Backhouse Jnr's son, James Backhouse *fil.* (1861-1945) assisted with in Wales in 1934. Backhouse *fil.*, who was then still running the family nursery in York (Davis 1989), was a great botanical friend of Mary Richards of Caerynwch, Dalgellau (W. M. Condry, *pers. comm.*). Richards co-authored 'A contribution to a Flora of Merioneth' (Benoit & Richards 1963), and was the well-known African plant collector (A. O. Chater, *pers. comm.*). Her manuscript journal for Wednesday, 21 December 1934 reads 'Mr. Backhouse, Drinkwater, Dr Owens Morris and I planted six *Trichomanes Radicans* – in the rocks in each side of the waterfall above the dam – and by Cefn Coch bridge. We know of only one plant in Merioneth and want to re-introduce it.'⁴ These sites were all within the grounds of Mary Richards's family home, Caerynwch. Drinkwater was her gardener. The plant has not survived (W. M. Condry *pers. comm.*).

NOTES

1. Official Correspondence. English letters, Kew (77, 262).
2. Official Correspondence. English letters, Kew (77, 263).
3. Both letters are in the Miscellaneous Handwriting Collection of the Botany Department, the Natural History Museum, London. The first is dated 27 October, 1876, and the second 12 August, 1884. The latter letter will be discussed in detail in the author's thesis on the botanical discovery and floristic recognition of Upper Teesdale.
4. The manuscript journal of Mary Richards is in the personal possession of W. M. Condry.

ACKNOWLEDGEMENTS

I should like to thank Marjorie Sledge on behalf of her late husband W. Arthur Sledge, and Albert Henderson and Professor H. J. B. Birks for critically reading the manuscript and for their valuable suggestions. I should also like to thank Professor Birks for making available to me copies or transcripts of certain correspondence, and Bill Condry for providing me with a copy of the abstract from Mary Richard's journal.

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RESPONSE TO THE ABOVE PAPERS

"The contentious phrase in our paper was perhaps ill advised in that we did not qualify it with our own belief that this suspicion was unfounded. I only hope a century after my death two such formidable champions would exist to defend my honour, though hopefully not without better cause.

It is sad to think that Backhouse's material may live on anonymously in our botanic gardens, his remarkable powers of discovery testified to only by a few herbarium sheets whose worth is lessened by their lack of provenance. We cannot tell if the secrecy maintained by the Backhouse family and friends, or the latest generation of self-appointed guardians, ultimately protects or profits this species.

Hopefully the work currently in progress in Manchester will provide answers to some of the enigmatic questions posed by this, as yet almost completely uninvestigated, species. To ultimately safeguard this fascinating plant it is not enough to throw a cloak of silence around it."

F. J. Rumsey

THE ECOLOGY OF LONG-EARED OWLS WINTERING IN SOUTH WEST YORKSHIRE

JEFF LUNN

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INTRODUCTION

Long-eared Owls *Asio otus* are a sparse breeding species in Yorkshire, but numbers of continental immigrants supplement the population in autumn and winter, when communal roosts can be found in a variety of habitats such as conifer plantations, carr woodland and scrub (Mather 1986). A roost at Haw Park, Wakefield has been known about since the mid-1950s and was studied by J. C. S. Ellis and in detail by J. S. Armitage between 1958 and 1965 (Armitage 1968). This paper presents further information concerning this roost from 1966 to 1990.

METHODS

Groups of trees traditionally used for roosting were checked regularly during October to April each winter, though once birds were located care was taken not to disturb the roost except in exceptional circumstances such as the collection of food pellets. Observations were made from nearby vantage points at dusk to count birds emerging from the roost. Mist-netting of birds for ringing purposes was carried out in some years by placing nets on farmland at right angles and parallel to the roosting plantation: birds were caught after dark as they hunted along the plantation edge, and also as they briefly stayed around the edge, sitting on posts or chasing each other before dispersing to the hunting areas.

Samples of pellets were taken from underneath the roost trees, air-dried, measured and examined according to Yalden (1977). Exhaustive identification of bird remains was not attempted given the absence of published references on the subject, but some comparisons were made with the reference collection held at Weston Park Museum, Sheffield.

Habitat analysis of the surrounding area was made using maps prepared by the Phase 1 Habitat Survey of West Yorkshire 1986 (Ecological Advisory Service/Nature Conservancy Council) using standard methodology (Nature Conservancy Council 1990).

THE STUDY AREA

Haw Park (GR: SE 3615) is situated between Wakefield and Barnsley, on Carboniferous Coal Measures at about 60 metres a.s.l. It consists of 68 hectares of woodland considered to be 'ancient' (ie sites with a continuous history of woodland cover since around 1600 AD, Nature Conservancy Council 1988), though the majority of this has been replanted with conifers (86%, mainly Larch *Larix*, Pine *Pinus* and Spruce *Picea*). The general locality is, however, rich in habitats. Table 1 shows the main land use in the nine 1 km square (900 hectares) centred upon Haw Park. This area is arbitrarily selected since no data appears to be available on the winter feeding range of Long-eared Owls, but it does provide an indication of the range and quantity of habitats readily accessible for hunting. Birds have been seen flying over the nearby Anglers Lake (1.5 km east) and west bank, Wintersett Reservoir (1.5 km south-east) giving a local indication of range. Some published data concerning summer territories suggest this is variable; in Finland, for example, territories can vary between 50 and 100 ha (Mikkola 1983), though of course the significance of this in relation to winter behaviour is questionable.

Whilst arable land (including 'improved' grassland, usually a monoculture of rye-grass *Lolium perenne*) dominates as might be expected, the proportion of built-up and industrial land is low, and woodland, semi-improved grassland (defined as grassland which may have received some treatment, but which still retains a diversity of original species and is likely

TABLE 1
Land-use in 9 x 1 km squares centred upon Haw Park, Yorkshire

Habitats	Area (ha)	%
Coniferous woodland	58	6.4
Deciduous woodland + scrub	107	11.9
Semi-improved grassland	76	8.4
Amenity grassland	29	3.2
Water	106	11.8
March	1	0.1
Arable	470	52.3
Built-up areas/industry*	53	5.9
Total	900	100.0

*Built-up areas/industry includes residential, farms, coal stocking land.

to be of some wildlife interest) and water are major features of the landscape. The figures belie the pattern of habitats in the locality, which tend to be small parcels of land with consequently a large area of 'edge' habitat which is often important for wildlife. There are in addition, numerous linear features including disused canals and railways, hedgerows, woodland rides, streams and road verges supplementing the mosaic and accentuating the edge effect. The locality is of considerable wildlife value in a West Yorkshire context and affords rich hunting grounds for predators.

The actual roost sites within Haw Park were located in dense larch and pine plantations. That used in the 1960s and described by Armitage (1968) was abandoned in 1969 when birds moved to another larch plantation some 500 metres to the north-east and in later years birds roosted in the pine areas to the north of the larches. This plantation was established around the late 1950s. There were successful discussions with the foresters responsible for maintenance of the plantations, which resulted in their limiting the usual silvicultural treatment of 'brashing' (removing lower branches) around the roost trees, thus enabling

thick cover to be maintained throughout the study period. Birds could be observed using branches from almost ground level to 3-4 metres provided there was sufficient cover.

Although the general locality has remained much the same over the last 20 years, one major change during the period was the development of a large opencast site during the early 1980s. This has now been restored to a lake ('Anglers') surrounded by amenity grassland and immature plantations.

ARRIVAL AND DEPARTURE

Although the roost was checked regularly, nightly observations were impractical and only an approximation of arrival and departure dates can be made. For five winter seasons 1976/77 to 1980/81 the mean arrival date was 20 November (range 27 October to 20 December) and the mean departure date 25 March (range 24 February to 19 April). However, these dates must be treated with some caution since Long-eared Owls bred or attempted to breed in the locality in at least six years throughout the study period (see Figure 1) and the possibility remains that local birds may have joined the winter visitors.

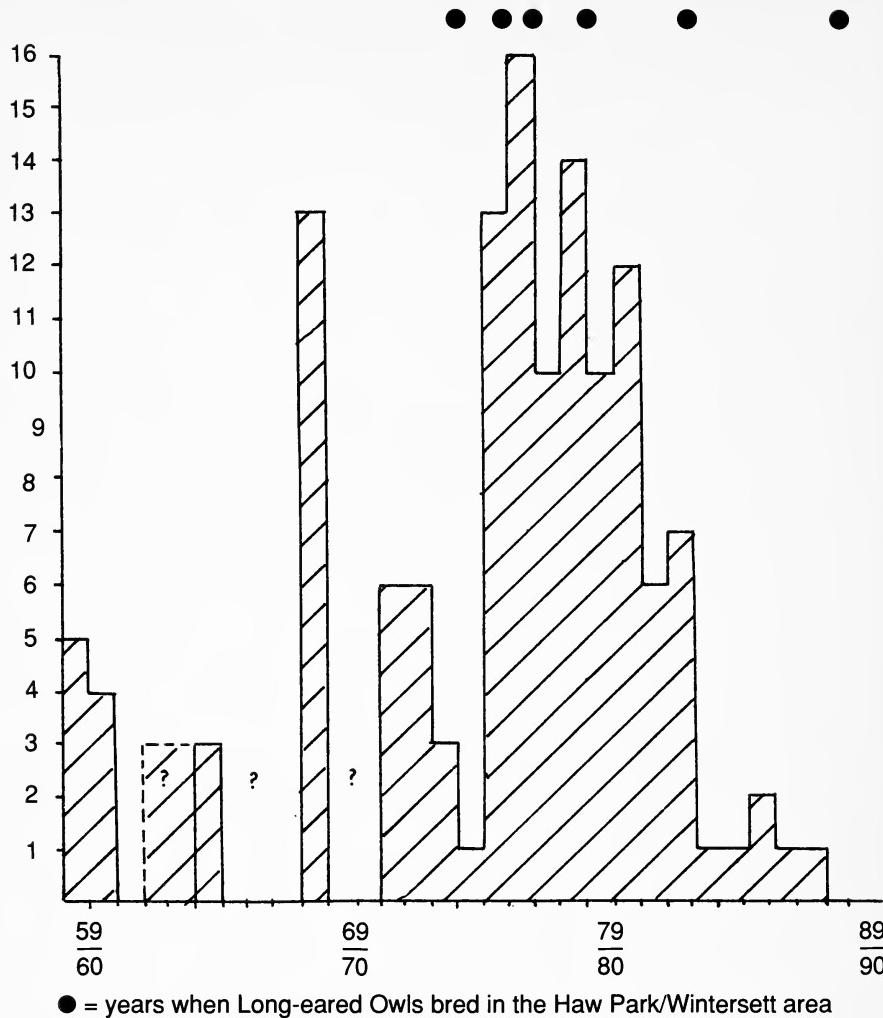
POPULATION SIZE AND MOVEMENT

The numbers of birds using the roost varied markedly. Maxima for each winter period are given in Figure 1, but reached 16 in 1976/77 and 13-14 in 1968/69, 1975/76 and 1978/79. Numbers declined sharply after the 1982/83 winter and since then have been very low. Some local observers have commented that the roost may now have been abandoned, though it is possible that it may have shifted to another site in the area. It is interesting to note that the large influx in the 1975/76 winter corresponded with a large national influx into Britain (Glue, in Lack 1986). High numbers over the next five winters might have reflected this initial influx, or local recruitment to the winter population through local breeding attempts, half of which occurred during this period. However, it is also noteworthy that another major influx in autumn 1986 is not reflected in the Haw Park data, yet large numbers did appear in Yorkshire, for example, in the Doncaster area (Glue and Whittington 1987, Curtis 1988, Howes & Thorpe 1990). Armitage argued that the birds were possibly of continental origin, comparing arrivals on the Yorkshire coast. Whilst the majority of the Old World population (including Britain) is thought to be sedentary, northern populations, particularly from Fennoscandia are known to be migratory and nomadic towards the south and west (Mikkola 1983). Despite the fact that 20 Long-eared Owls were captured in the study area, no conclusive proof has been forthcoming to confirm the birds' origins, and local movements of birds are still little known. One of the ringed birds was recovered in Britain, being found dead at Sprotborough 20 km south east of Haw Park on 1 March 1981, having been ringed on 12 January 1980. It remains a strong possibility that the birds are of continental origin, though no conclusive evidence is available to support this view.

DIET

Pellet analysis

Samples of pellets were collected during the four winters 1979/80 to 1982/83. Apart from the 1980/81 winter when monthly samples were collected between January and April, all collections were made at the end of the winter period to avoid disturbance. A total of 417 pellets was collected over these four seasons, supplementing the 11 analysed by Ellis from 15 February 1958 and the 99 by Armitage. In addition, some pellet debris was also analysed since one factor to emerge from the practicalities of examining owl pellets was that pellets which were comprised mainly of bird remains had a greater tendency to fragment and disintegrate than those comprised mainly of mammalian prey. Use of pellet only analysis would, therefore, have underestimated the proportion of avian prey in the diet of the Haw Park owls. The figures, therefore, represent total numbers of prey derived predominantly from pellets, but with some from pellet debris.



● = years when Long-eared Owls bred in the Haw Park/Wintersett area

FIGURE 1
Maximum numbers of Long-eared Owls *Asio otus* at Haw Park, Yorkshire over each winter period 1959/60 to 1989/90

The number of prey items per pellet is given in Table 2. In contrast to Armitage (1968) there was no appreciable difference between the numbers of pellets containing one or two prey items (87% in total). This study did, however, reveal seven pellets containing four or five prey items. The largest number of prey in one pellet was the remains of five Short-tailed Voles found in a single pellet from the 1980/81 winter.

Pellet dimensions were mean diameter 19.3 mm ± S.D. 2.2 mm and length 34.2 mm ± S.D. 7.6 mm ($n = 100$), corresponding very closely to the average 33 x 19 mm given by Glue and Hammond (1974) for British samples ($n = 2484$).

TABLE 2
Number of prey items per pellet of Long-eared Owl, Haw Park, Yorkshire

Prey items	79/80 %	80/81 %	81/82 %	82/83 %	Average %
1	43	41	56	44	45
2	48	46	30	44	43
3	7	10	13	12	10
4		2	1		1
5		1			1
No. of pellets	104	225	89	9	417

Prey composition

Prey composition for each of the four years is given in Table 3. Figures from Ellis and Armitage are also given for comparison. In this study 1119 prey items were identified. The most important prey was Short-tailed Vole *Microtus agrestis* (56% of the diet), followed by mice *Apodemus* (20%), birds (15%) and Bank Vole *Clethrionomys glareolus* (8%). These four taxa constituted 99% of the prey, with mammals accounting for over 84%. The mice are almost certainly Wood Mouse *Apodemus sylvaticus* since the Yellow-necked Mouse *A. flavicollis* is not known to occur in the area (Delany 1985).

The overall diet corresponds closely to that presented by Glue and Hammond (1974) for Britain (Table 4). At Haw Park more Short-tailed Voles and Wood Mice were taken, and slightly fewer birds and Bank Voles. The paucity of other prey is noteworthy, especially of shrews *Sorex*. These animals (Common *S. araneus*, Pigmy *S. minimus* and Water *Neomys fodiens* shrews) do occur in the area, but were represented by only three prey items. This is probably a genuine reflection in prey preference since shrews have been notably absent in analyses from other lowland sites in the Sheffield area (Toher & Whiteley 1986) yet are readily taken in other environments such as upland moorland where presumably preferred prey is less abundant, eg the Peak District (Toher & Whiteley 1986, Lunn 1985), and Scotland (Village 1981). Other owl species, especially Barn Owls *Tyto alba* are known to take a much higher proportion of shrews in their diet, even in the Wakefield and Barnsley areas (*pers. obs.*). The numbers of other mammalian prey are also inconsequential in relation to the overall diet, though the taking of large mammals such as rats *Rattus* (almost certainly *R. norvegicus*) and Water Voles *Arvicola terrestris* is of interest and would provide the owls with a more substantial meal. The presence of Harvest Mice *Micromys minutus* is also of interest since these animals are quite local in Yorkshire (Delany 1985) and although nests have been found at nearby Wintersett Reservoir (*pers. obs.*) animals could be more generally widespread in the Haw Park area. They have been recorded as Long-eared Owl prey from Hatfield Moors, Denaby Ings, Potteric Carr, Thorpe Marsh and Skew Bridge (C. A. Howes, *in litt.*). In a European context, Mikkola (1983) shows that rodents, especially voles, are the most important prey of the Long-eared Owl. In Fennoscandian countries their proportion in the diet is even greater (over 90%), though in Romania the diet is more varied with mice, rats and birds predominating.

One hundred and sixty six bird prey items were identified. In most pellets the most readily identifiable bone was the humerus and both upper and lower mandibles were less frequently found. However, in some samples, skulls/upper mandibles represented the most frequent remains and counts of these were then used to estimate minimum numbers of prey. Species identified included Greenfinch *Carduelis chloris*, Redpoll *Acanthis flammea*, Starling *Sturnus vulgaris*, Robin *Erithacus rubecula*, tits *Parus* and Song Thrush *Turdus philomelos* (all passerines). However, the most abundant prey by far was sparrows *Passer*.

TABLE 3
 Prey of Long-eared Owls at Haw Park, Yorkshire. Figures given as percentage numerical prey (prey items in brackets).
 Data by Ellis and Armitage added for comparison. See text for English names of prey

Prey	Year					Ellis 1957/58	Armitage 1963/64	Armitage 1964/65
	1979/80	1980/81	1981/82	1982/83	Total			
<i>Microtus agrestis</i>	28.4 (83)	69.5 (428)	59.6 (106)	24.2 (8)	55.9 (625)	79.1 (34)	49.1 (27)	67.9 (55)
<i>Clethrionomys glareolus</i>	7.2 (21)	3.6 (38)	12.4 (22)	21.2 (7)	7.9 (88)		20.0 (11)	4.9 (4)
<i>Apodemus (sylvaticus)</i>	40.8 (119)	10.7 (66)	16.9 (30)	24.2 (8)	19.9 (223)	9.3 (4)	16.4 (9)	17.3 (14)
<i>Rattus</i>		0.2 (1)	1.2 (2)		n.s. (3)			
<i>Arvicola terrestris</i>		0.4 (2)		6.1 (2)	n.s. (4)			
<i>Mus musculus</i>	0.7 (2)	0.2 (1)	0.6 (1)		n.s. (4)			
<i>Micromys minutus</i>		0.6 (3)			n.s. (3)			
<i>Sorex araneus</i>			0.6 (1)		n.s. (1)	2.3 (1)		
<i>Sorex minutus</i>	0.4 (1)		0.6 (1)		n.s. (2)			
BIRDS	22.6 (66)	12.5 (77)	8.4 (15)	24.2 (8)	14.8 (166)	9.3 (4)	12.7 (7)	9.9 (8)
<i>Coleoptera (Geotrupes)</i> (Carabidae)	0.7 (2)		0.6 (1)		n.s. (3)		1.8 (1)	
Total prey items	292	616	178	33	1119	43	55	81

TABLE 3
Prey of Long-eared Owls at Haw Park, Yorkshire. Figures given as percentage numerical prey (prey items in brackets).
Data by Ellis and Armitage added for comparison. See text for English names of prey

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<i>Micromys minutus</i>		0.6 (3)			n.s. (3)				
<i>Sorex araneus</i>			0.6 (1)		n.s. (1)		2.3 (1)		
<i>Sorex minutus</i>	0.4 (1)		0.6 (1)		n.s. (2)				
BIRDS	22.6 (66)	12.5 (77)	8.4 (15)	24.2 (8)	14.8 (166)	9.3 (4)	12.7 (7)	9.9 (8)	
<i>Coleoptera (Gecritipes) (Carabidae)</i>	0.7 (2)		0.6 (1)		n.s. (3)				
Total prey items	292	616	178	33	1119	43	55	81	

TABLE 4
Comparison of percentage numerical prey of Long-eared Owls at Haw Park, Yorkshire
and from Britain as a whole

Prey	Haw Park (all winters combined)	Britain Glue and Hammond 1974 (winter period)
	%	%
<i>Microtus agrestis</i>	57.1	45
<i>Clethrionomys glareolus</i>	7.9	9
<i>Apodemus</i>	19.3	16
<i>Rattus</i>	n.s.	3
Birds	14.9	23
Other prey	0.8	4
Total No. of items	1298	2577

This reflects Glue & Hammond's (1974) results and suggestion that Long-eared Owls prey on the communal roosts of House Sparrows *P. domesticus* in particular. Both House and Tree Sparrows *P. montanus* were recorded in flocks of up to several hundreds in the study area during the period in question (Wakefield Bird Reports 1974-1988).

Prey composition by weight

Workers have traditionally converted numbers of prey items taken to an estimate of prey weight based on a standard prey unit size of 20 g (Yalden 1977). Conversion factors cited in Smal (1987) for Barn Owls, were used to convert the prey taken at Haw Park into percentage weight taken which is given in Table 5. For bird prey measurement of the humerus gives a good indication of prey weight and analysis of humeri provided a figure of

TABLE 5
Prey of Long-eared Owls at Haw Park, Yorkshire as percentage prey weight, based on
standard 'prey unit' (see text for details)

Prey	Conversion Factor	% Prey Weight	
<i>Microtus agrestis</i>	1	52.0	(625)
<i>Clethrionomys glareolus</i>	0.96	7.0	(88)
<i>Apodemus (sylvaticus)</i>	1	18.6	(223)
<i>Rattus</i>	2.96	0.7	(3)
<i>Arvicola terrestris</i>	5	1.7	(4)
<i>Mus musculus</i>		n.s.	(4)
<i>Micromys minutus</i>		n.s.	(3)
<i>Sorex araneus</i>	0.4	n.s.	(1)
<i>Sorex minutus</i>	0.18	n.s.	(2)
BIRDS	1.45	20.0	(166)
<i>Coleoptera (Geotrupes)</i>		n.s.	(3)
<i>(Carabidae)</i>		n.s.	(1)

29.1 g (Morris & Burgis 1988) with the main range between 14.9 g and 48.7 g (based on mean humerus length $19.2 \text{ mm} \pm \text{S.D. } 3.7 \text{ mm}$, $n = 140$). The main difference in this analysis is that birds assume a greater (5.2%) proportion of the diet at the main expense of Short-tailed Voles, and the significance of larger prey such as rat *Rattus* and Water Vole *Arvicola terrestris* increases slightly. The mean bird weight is considerably smaller than that of 51.0 g cited for Barn Owls in Ireland (Smal 1987) and is comparable to the assumed average weight of Short-tailed and Bank Voles and Wood Mouse. There is likely to be some variation in the weights of animals taken, because of the variability of individuals and seasonally related factors such as fat deposition. However, in broad terms, a prey weight of 20-30 g might indicate the preferred optimal size of prey which Long-eared Owls might actively search for.

Seasonal variation in diet

During the 1980/81 winter, four samples of pellets representing prey taken in January, February, March and April were separately analysed and are shown in Figure 2. Whilst the

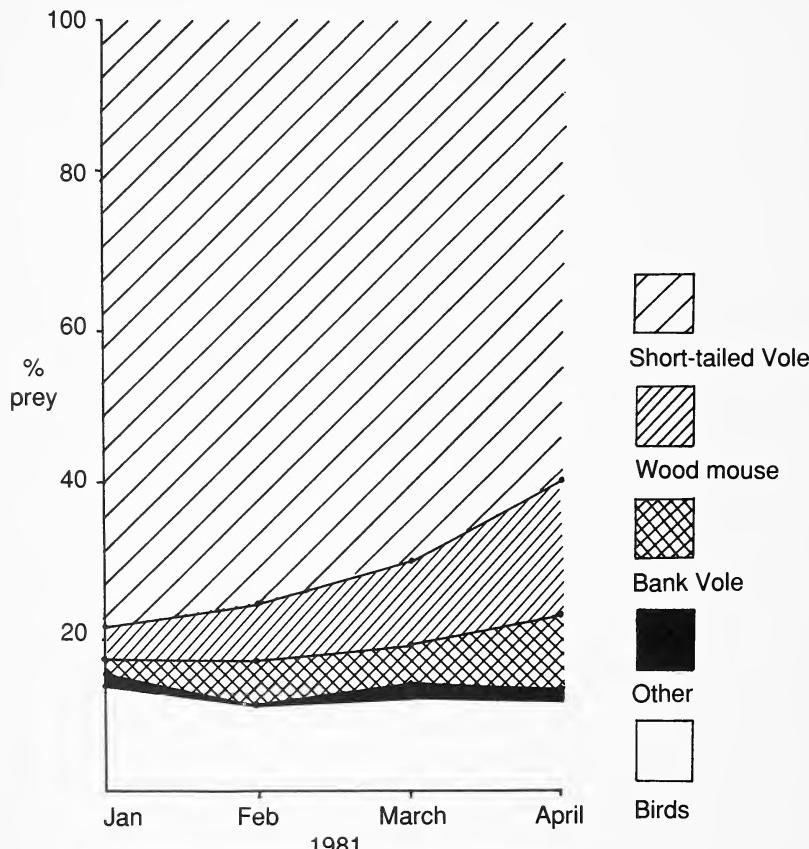


FIGURE 2
Seasonal variation of prey taken by Long-eared Owls at Haw Park, Yorkshire Winter 1980/81

results are not dramatic, a trend towards the end of the winter is apparent when other prey, especially mice, figured more prominently. This may be because voles were less common towards spring, as demonstrated in Scotland by Village (1981), and owls were forced to take alternative prey. Other factors may also play a part and Armitage (1968) suggested that weather might have some influence, forcing birds to hunt in more sheltered habitats during strong winds which are more prevalent in spring. However, the analysis does demonstrate the need for taking into account the time of year when pellets are collected. In all of the years of the study, pellets mainly from towards the end of the wintering period were sampled, and analysis of November/December samples may prove to comprise an even great proportion of Short-tailed Vole prey.

Annual variation in diet

Annual comparisons of prey taken can be seen in Table 3. A striking feature is that during the 1979/80 winter, Wood Mice constituted the main prey item (41%), with Short-tailed Voles only 25% and birds 23%. This possibly reflects the scarcity of vole prey since Microtidae rodents are well known to exhibit cycles of abundance over three or four year periods and suffer 'crashes' periodically. The figures suggest that 1979 could have been one such year. This phenomenon has important consequences for breeding success of Long-eared Owls which have poorer breeding results in poor vole years (Village 1981) and in northern latitudes may even prevent breeding (Mikkola 1983).

SUMMARY

The wintering ecology of a long established roost of Long-eared Owls *Asio otus* at Haw Park, Wakefield, Yorkshire was investigated from 1966 to 1990, supplementing earlier work by Armitage (1968).

1. The roost sites and surrounding land (9 km²) are described in the context of available habitat capable of supporting up to 16 owls.
2. Arrival was generally in November and departure in March. Long-eared Owls also attempted to breed during the study period, but no conclusions could be drawn as to whether the birds were of local, British or Continental origin.
3. The winter diet comprised mainly of Short-tailed Voles (57%) with substantial proportions of Wood Mice (19%) birds mainly sparrows *Passer* (15%) and Bank Voles (8%) and corresponded closely to other studies of the diet of Long-eared Owls in Britain. Other prey included Water Vole, Rat and Harvest Mouse. Shrews were notably scarce.
4. Some annual and seasonal variation in prey was detected. It is suggested that Short-tailed Voles are the preferred prey of Long-eared Owls at Haw Park, but that during periods of vole scarcity in spring and during cyclical 'crashes' that owls switch to taking more Wood Mice and birds. The average weight of the four main prey species is broadly similar and it is also suggested that this represents the optimal prey weight for feeding efficiency for Long-eared owls.

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I would like to thank the many observers from Wintersett Ringing Group, Wakefield Naturalists' Society and Barnsley Bird Study Group, who have generated and contributed the records over the years, which I have used in this study. Peter Smith in particular made available his extensive knowledge of the roost and provided many helpful comments. I am grateful to Colin Howes for his constructive comments on an earlier draft of this paper and to Derek Whiteley for assistance at Sheffield Museum.

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BOOK REVIEW

Coppiced Woodlands: Their Management for Wildlife by R. J. Fuller and M. S. Warren. Pp. 32 with 19 colour plates and 9 figures. Nature Conservancy Council, Peterborough. 1990. £2.50

Woodland Rides and Glades: Their Management for Wildlife by M. S. Warren and R. J. Fuller. Pp. 32 with 19 colour plates and 9 figures. Nature Conservancy Council, Peterborough. 1990. £2.50

These two booklets are the first volumes in an intended series by the Nature Conservancy Council on aspects of management of various habitats for wildlife. As stated in the Preface to these booklets, they are not just prescriptive guides or recipe books for management work, but compilations of the studies and an explanation of the scientific evidence on which the management guidance is based.

The structure of the text falls roughly into the following notional sections: an introduction outlining the current situation, including the conservation value of the habitat concerned; the response of wildlife to possible management procedures for this habitat; advice on the most appropriate management techniques; and a bibliography of relevant scientific publications. The volumes are illustrated by very attractive, well produced colour photographs which nicely complement the text, as well as line drawings.

These are attractive and informative booklets that can be read with enjoyment by anyone, purely for interest about the surrounding countryside, but which should prove particularly useful to their primary audience of people who are responsible for management of a specific habitat, an area of woodland in this case. I look forward to future volumes in the series.

THE COMMON SANDPIPER POPULATION OF THE LADYBOWER RESERVOIR COMPLEX — A RE-EVALUATION

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INTRODUCTION

During the years 1979-1982, I undertook a single census each year of the Common Sandpiper *Actitis hypoleucus* population breeding on the shores around the reservoirs in the Ladybower-Derwent-Howden complex (Yalden, 1984) and continued for three further years. Each census required about 14.5 hours of fieldwork. It was conducted during the third weekend in June because most pairs have hatched their eggs by this time (Holland et al, 1982a) and are stridently anxious about their chicks, which makes them easy to detect. It was, however, acknowledged that the population estimates so obtained would be underestimates, because pairs that had already failed (not laid eggs, failed to hatch them, or lost their young chicks already) and those that were late (perhaps with replacement clutches) would probably be overlooked. Some extra birds (additional, that is, to 'alarming' parents) were noted on these surveys, and were presumed to belong to one or other of these groups, but they were less obviously tied to any particular territory, sometimes flying off to the opposite shore of the reservoir, and were hard to evaluate.

How seriously did these single-visit censuses underestimate the population? What were the sources of error? In 1989-1991, further, more detailed, studies of this population were undertaken, principally to investigate the possible impact of recreational disturbance (Yalden 1992). Censuses undertaken for these studies provide some answers to the questions posed. In addition, studies of the colour-ringed population along the nearby River Ashop provide more understanding about the behaviour of Common Sandpipers at different stages of their breeding cycle (Holland & Yalden, 1991; Yalden, 1986), and therefore help to evaluate the results of single-visit censuses.

STUDY AREA

The Ladybower-Derwent-Howden reservoir complex occupies the valley of the River Derwent along the Derbyshire-Yorkshire border in the Peak District. The Ladybower Reservoir, much the largest, is a two-armed reservoir made during 1943-45 by damming the River Derwent at SK200853, just below the confluence with the River Ashop. Thus the western arm drains the valley of the River Ashop, and the northern arm that of the River Derwent; their shorelines are roughly 10.6km and 8.6km respectively, a total of 19.2km. The Derwent dam at SK172898 was completed in 1914, and the resultant reservoir has 6.1km of shoreline, while the Howden dam at SK170924 was completed in 1912, and retains a reservoir with an 8.0km shoreline. The water levels in the three reservoirs can be manipulated so that, for instance, two might be kept nearly full and the third one much lower, but usually they are full at the end of winter, and draw down during the summer. Strong winds produce waves, so the upper shores are bare, and the banks often undercut. As the water level drops during May and June, the bare shingle or boulder shore provides an increasing area of foraging habitat for the Common Sandpipers, especially the chicks. The boulders and undercut banks also provide good refuges for the chicks.

The Ladybower Reservoir is stocked with Brown and Rainbow Trout (*Salmo trutta*, *S. gairdneri*) and supports an important recreational fishery, while the whole valley is a popular venue for informal recreation. The impact of these activities on the Sandpipers has largely been considered elsewhere (Yalden, 1984, 1992), but these survey results provide some supplementary information.

METHODS

In 1989 and 1990, census work was confined to the western arm of the Ladybower

TABLE I
 Results of censusing Common Sandpipers *Actitis hypoleucos* around the Ladybower-Derwent-Howden Reservoir system in 1991.
 There were 5 visits (v) to Derwent and Howden, 6 to W Ladybower and 7 to N Ladybower.
 The June column indicates the number of pairs 'alarming' (+ present, silent)
 on the weekend of 23-24 June (cf Table 2).

Reservoir/Shore	Length (km)	Common Sandpiper Territories			Fledged (%)	June	People				
		Present	(per km)	Hatched (%)			Anglers	Others	Total/n/km		
W Ladybower/N&E	5.8	6	(1.03)	4	(66)	1	(16)	2(+1)	126	45	4.9
W Ladybower/S	4.8	13	(2.71)	7	(54)	5	(42)	3(+7)	109	25	4.7
N Ladybower/E	4.4	13	(2.95)	6	(46)	5	(38)	2(+5)	72	29	3.3
N Ladybower/W	4.2	8	(1.90)	4	(50)	3	(38)	3(+6)	20	43	2.1
Derwent/E	2.8	5	(1.79)	4	(80)	4	(80)	5	0	15	1.1
Derwent/W	3.3	7	(2.12)	5	(71)	3	(43)	4(+2)	0	9	0.5
Howden/E	2.8	1	(0.36)	0	(0)	0	(0)	0(+3)	0	2	0.1
Howden/W	5.2	7	(1.35)	7	(100)	6	(86)	4	0	6	0.2
Total	33.3	60	(1.80)	37	(62)	27	(45)	23(+24)	327	174	c.2.5

Reservoir (Yalden, 1992). The whole shoreline was walked at weekly intervals from late April to mid-July. Sandpipers, anglers and other visitors being mapped and counted. Accumulated records of Sandpipers over the season were assessed to indicate how many pairs held territory, and where. Their behaviour over successive visits in June and July was used to decide whether they had hatched their eggs (agitated behaviour indicating that they were guarding chicks) and whether they had succeeded in fledging any (if they were behaving in this way over three or four successive weeks, then presumably at least one chick had fledged, since fledging requires 19 days).

In 1991, the whole reservoir complex was surveyed, but it was only possible to visit any one reservoir at two or three week intervals; five to seven complete surveys were made of each reservoir. The results for the western arm of Ladybower could be compared directly with the results for 1989-90, and these comparisons then used to moderate the results for the rest of the reservoir complex.

Population estimates made from the results for the whole season can be compared with those made during the third weekend in June (ie what might have been recorded in 1979-82). In particular, the reasons why particular territories might have been missed on such a single census could be established by reference to earlier and later visits.

RESULTS

The size of the population

The whole reservoir system held an estimated 60 pairs of Common Sandpipers in 1991, 40 pairs on Ladybower, 12 on Derwent and 8 on Howden (Table 1). Correcting for the size of the reservoirs, there were 2.03 pairs per km of shoreline around Ladybower, 1.97 pairs/km around Derwent, but only 1.00 pairs/km round Howden. The most popular shoreline was the east shore of north Ladybower, with 2.95 pairs/km.

The western arm of Ladybower had 31 pairs in 1989, 26 pairs in 1990 and only 19 pairs in 1991, or 61% of the 1989 figure. It is, of course, possible that some pairs had redistributed themselves, so that this apparent decline was actually balanced by increases elsewhere in the valley. However, our studies of the nearby riverine population show that Common Sandpipers are highly philopatric, with only 8% of males and 21% of females changing territories between years (Holland & Yalden, 1991). They also show that the population there declined sharply from 1988 to 1989 (21 pairs to 13 pairs) and it has not subsequently recovered (14 pairs in 1990, 10 pairs in 1991). We believe that these reductions are caused by increased adult mortality from cold weather in late April as the birds return from Africa; both 1988 and 1991 were indeed years with cold springs.

Evaluating single-visit censuses

Single-visit censuses in 1979-1982 recorded 28-36 pairs anxiously guarding chicks, while the comparable visits on 23-24 June 1991 found only 23 pairs (Table 2). Thus the population in 1991 was only 64%, apparently, of the 1981 figure; furthermore, the June census in 1991 located only 38% of the estimated 60 pairs present that year. On the western arm of Ladybower, 12 of 31 pairs (39%) were 'alarming' on 17 June 1989, and 11 of 26 pairs (42%) on 23 June 1990. Thus a single-visit census in late June is likely to detect about 40% of the total population.

In fact, a further 24 territories were apparently occupied in 1991, but the adults were not 'alarming', and therefore either had not yet hatched their eggs, or possibly had already failed. The repeated surveys can be used to evaluate these possibilities. Combining the three surveys (Table 3), it seems that about 12% of the pairs have still to hatch their eggs, and are only discovered 'alarming' on later surveys; about half of these were at least registered as occupied territories on the census, and half were completely missed. Only one territory was apparently missed because the chicks hatched early, had already fledged and had deserted the territory; fledging requires at least 19 days, and hatching very rarely occurs before 3 June, so one would expect to detect successful territories up to 23 or 24 June. The largest category of both silent and completely missed territories is of apparently

TABLE 2
**The results of single-visit June censuses of Common Sandpipers *Actitis hypoleucus*
breeding around the Ladybower Reservoir system, 1979-1991.**

Reservoir/Shore	1979	1980	1981	1982	1983	1984	1985	1991
W Ladybower/N&E	6	6	4	2	4	3	7	2
W Ladybower/S	4	6	8	5	7	6	10	3
N Ladybower/E	3	5	9	5	7	5	9	2
N Ladybower/W	6	7	5	8	1	8	5	3
Derwent/E	7	5	3	3	3	3	3	5
Derwent/W	3	5	3	1	7	10	4	4
Howden/E	1	1	3	1	2	0	0	0
Howden/W	0	1	1	2	1	0	2	4
Total	30	36	36	28	32	35	40	23

TABLE 3
**Evaluating the single-visit June census around the Ladybower Reservoir
system, 1989-1991. The whole system was covered in 1991,
only the W arm of Ladybower in 1989 and 1990**

	1989	1990	1991	Total (%)
Pairs present, alarming	12	11	23	46 (39)
Pairs present, but silent	6	11	21	38 (32)
of which, already failed?	(4)	(11)	(16)	(31) (26)
already fledged	—	—	—	—
yet to hatch	(2)	—	(5)	(7) (6)
Pairs completely missed	13	4	16	33 (28)
of which, already failed?	(11)	(3)	(11)	(25) (21)
already fledged	—	(1)	—	(1) (1)
yet to hatch	(2)	—	(5)	(7) (6)
Total Population	31	26	60	1 1 7

unsuccessful pairs. Some of these had definitely failed, in that the parents had been "alarming" on an earlier visit but were either silent or had already left by the census date (12 out of the 56 in these two categories). The others never provided any indication that they ever hatched chicks; they could have done so, between visits, but then lost them; they may have lost their eggs; or they may never even have laid a clutch. So far as population dynamics is concerned, they represent failed breeding attempts, and so far as censusing is concerned they indicate a large segment of the population which is difficult to detect and difficult to evaluate.

Impact of people

Combining all the visits, 327 anglers and 174 other visitors were counted on the shorelines of the three reservoirs in 1991 (Table 1). All the anglers and 82% of the other people were around Ladybower Reservoir, with the western arm receiving most visitors. Expressed as the number of visitors per visits per km of shoreline, west Ladybower received 4.5, north Ladybower 2.3, and the rest fewer than one visitor/km. These figures might be slightly biased, because the area is most popular on Sundays, and the upper reservoirs were only censused on one Sunday, whereas Ladybower received three Sunday visits. Any such bias is modest compared with the substantial difference in visitor pressure, however, and anglers are confined to Ladybower. There was no systematic variation in Common Sandpiper density between Ladybower and Derwent Reservoirs, despite the different angling use; both had around two pairs per km of shoreline. (Howden appears to be less suitable habitat, and had a lower Sandpiper density). However, there is a statistically significant difference in the proportion of territories which succeeded in hatching, 21 out of 40 at Ladybower versus 16 out of 20 at Derwent and Howden ($\chi^2 = 4.26$, $p=0.036$) (Table 1). Success to fledging differed even more markedly (14 out of 40 at Ladybower, 13 out of 20 at Howden and Derwent; $\chi^2=4.85$, $p=0.026$). This suggests that recreational pressure might be having an impact on the breeding attempts and breeding success around Ladybower.

DISCUSSION

At 1.8 pairs/km around the shoreline of these reservoirs, including both favourable and unfavourable stretches, this is quite a dense population, comparing favourably with various riverine populations: Cuthbertson et al (1952) 1.05 pairs/km; Cowper (1973) 0.13; Jones (1983) 0.3-2.3; Vickery (1991) 0.2-1.12; Holland et al. (1982b) 0.7-2.4. However, comparison of the June censuses with those made in earlier years (Table 2) and the figures for west Ladybower for 1989-1990 suggest that the 1991 population is low compared to what it used to be. The 1989-1990 figures for west Ladybower may not be a fair basis for comparison if the 1991 population had redistributed itself around the reservoirs, but comparison with the earlier (1979-81) censuses does not suggest that this has happened. In that case, the 1989 population for the whole reservoir complex might have been 103 pairs, a density of 3.1 pairs/km.

Single visits censuses in late June apparently only found about 40% of the population "alarming" to protect their chicks, and detected about 70% of the population altogether, if "silent" birds are also counted. If the 29-36 pairs of "alarming" birds counted in 1979-1981 are 'corrected' in the same way populations then for the whole reservoir system must have been 73-90 pairs, at least: the importance of this area for the species, both within the Peak District and nationally, was correspondingly underestimated in our earlier papers (Holland et al., 1982a, 1982b).

Reservoirs are better buffered against bad weather in April than the rivers, and one would expect their invertebrate food supply, and therefore the Sandpipers themselves, to be less affected. We noted that the drop in population in our riverine population from 1980 to 1981 was not immediately reflected in either this nearby reservoir population or the national figures from the Waterways Bird Survey (Holland & Yalden, 1991), but there were declines from 1981 to 1982. If the 1981 snows killed a number of the better

established, older, breeding sandpipers, one might predict lower breeding success that year, therefore fewer recruits and a lower population in 1982. This seems to have happened, and might also be what affected the west Ladybower population from 1989 to 1990 and to 1991. We expected that the reservoir population might have better breeding success than our riverine population, but the proportions of territories that succeed to hatching and to fledging, 62% and 45%, on the reservoir are very similar to the figures, 62% and 41%, from our riverine study population, averaged over 15 years. It is of course possible that, for instance, each successful territory around the reservoirs fledges two young on average, as against only one young per successful riverine territory, and that the reservoir population is therefore more productive, but we have no particular evidence for such an argument. We reported that the River Ashop population produces only just enough recruits to balance the normal, low (*c.* 20%) adult annual mortality; when there is more extreme adult mortality (40-50%) in one of the severe April cold spells, it takes the population several years to creep back up to its former level (Holland & Yalden, 1991). The figure just quoted suggests that recruitment is not noticeably better for the reservoir population. If true, it is obviously important to the conservation of this population that successful breeding areas are protected.

ACKNOWLEDGEMENT

I thank Phil Holland for co-operation in this and our other studies, my wife for her logistical support, and Severn-Trent Water plc, through Geoff Nickolds, for permission to study the species around these reservoirs.

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ENTOMOLOGICAL REPORTS FOR 1987-1989

COLEOPTERA: CARABIDAE-HYDROPHILIDAE, CERAMBYCIDAE-PLATYPODIDAE

J. H. FLINT

Until 1987 the Coleoptera reports had been compiled by a single author. From 1987, to spread the load of reporting and recording, the work was shared between three with responsibility for the families as below –

J. H. Flint	Carabidae-Hydrophilidae
	Cerambycidae-Platypodidae
M. L. Denton	Staphylininae
R. J. Marsh	Sphaeritidae-Aderidae (except Staphylininae)

This report covers the families allowed to the present author for the years 1987-1989.

In the list of more notable beetles that follows, twelve species are recorded for the first time in Yorkshire. Most of these, as is usual, may have been passed over previously because they are not easily distinguished but two are outstanding. The large ground beetle *Carabus auratus* is almost certainly a casual introduction from the continent, transported with imported vegetable produce. The second is the distinctive longhorn beetle *Phytoecia cylindrica* and its occurrence at Allerthorpe may indicate that it is extending its range northwards.

My thanks go to all who have contributed reports and records or who have assisted with determining of species. The initials used in the list that follows are: KNA = K. N. A. Alexander; RBA = R. B. Angus; RGB = R. G. Booth; JDC = J. D. Coldwell; RHD = R. H. Deaton; MLD = M. L. Denton; WAE = W. A. Ely; HEF = Mrs. H. E. Flint; JHF = J. H. Flint; SPG = S. P. Garland; PK = P. Kendall; RSK = R. S. Key; TBK = T. B. Kitchen; SPL = S. P. Lazenby; RJM = R. J. Marsh; KGP = K. G. Payne; AS = Miss A. Shields; PS = P. Skidmore and AW = A. Wilkinson.

† New county records. * New vice-county records.

† *Carabus auratus* L. (64) Allerton Bywater (Leeds Road) (SE28), 3/88, taken by Mrs C. Smith and identified by Dr S. L. Sutton. This large and splendid ground beetle is an occasional introduction to Britain; it does not appear to have been reported previously in Yorkshire.

Nebrisia salina Fairm. (*65) Dent (SD6886), 21/5/79; WAE.

Broscus cephalotes L. (63) Blaxton Common, 13/8/88; RSK.

† *Asaphidion curtum* Hey. The most common and widespread of the three species formerly lumped under *flavipes* L. Reported from (61) Saltmarshe, Howden, Boynton, Kelfield Ings; (63) Blackmoorfoot, Sheffield, Barnsley, Bretton, Denaby Ings; (64) Barlow, Cattal, Moor Monkton.

† *A. flavipes* L. (64) Barlow (SE6330), 29/5/52; TBK.

† *A. stierlini* Hey. (63) Walkley, Sheffield (SK0889), demolition site, 1987; ASL. (64) Hazelwood Castle, Aberford (SE4439), 6/11/88; RBA det. MLD.

Bembidion harpaloides Serv. (*65) River Swale at Great Langton (SE2897), 23/4/84; H. Mendel.

B. litorale 01. (62) Beningborough Park, 1987; KNA.

Laemostenus terricola Hbst. (63) Attercliffe, Sheffield (SK381893), 5/10/88; ASL. In disused chapel with pigeon muck and rat holes.

Agonum livens Gyll. (63) Oak Hill, Goole (SE7222), 16.6.87; PK.

† *Perigona nigriceps* Dej. (64) Aberford (SE441369), 27/8/89; RBA det. PS.

Amara eurynota Panz. (63) Sheffield, on waste ground. ASL reports many records of

this conspicuous beetle in Sheffield and JDC reports it from Barnsley. JHF did not find any on similar sites in Leeds in the late 1940s and there is still no record for VC64 although it has been found in all the other vice-counties.

- A. praetermissa* Sahl. (61) Wharram Quarry (SE8665), 9/7/89; PK. (63) Brightside, Sheffield (SK386905), 18/7/88; ASL. Waste ground on limestone core near railway embankment.

Harpalus puncticeps Steph. (63) Worsborough reservoir, 20/9/87; JDC. Only reported three times before in Yorkshire.

H. tardus Panz. (61) Southcliffe Common (SE83), 5/87; MLD.

Acupalpus meridianus L. (63) Agden (SK253929), 14/2/87; MLD. In flood refuse. Not reported since Hey's List in the nineteenth century.

Haliplus laminatus Schall. (61) Ulleskelf (SE5239), 6/9/88; KGP.

Ilybius subaeneus Er. (64) Cawood (SE5737), 25/8/88; KGP.

Helophorus arvernicus Muls. (*61) Newton Mask, R. Derwent (SE7050), 1984; RGB.

- † *H. grandis* Illig. (63) Rushy Moor, Askern (SE5612), 22/3/86; WAE. Scholes Pond (SK3895), 23/3/87; WAE (65) Semerwater (SD9186), 20/8/88; WAE.

H. minutus F. (*65) Semerwater (SD9186), 20/8/88; WAE.

H. obscurus Muls. (*63) Rushy Moor, Askern (SE5612), 23/7/86; Scholes Pond (SK3895), 23/3/87; WAE. (*65) Semerwater (SD9186) 20/8/88; WAE.

Cercyon haemorrhoidalis F., *C. lateralis* Marsh., *C. pygmaeus* Illig., *C. quisquilius* L. (*65) Semerwater (SD9185), 20/8/88; RJM.

- † *Anacaena lutescens* Steph. (63) Drop Clough (SE01), 29/1/89; MLD.

Grammoptera holomelina Pool (63) Oak Hill, Goole (SE7222), 16/6/87; PK. Worsborough (SE3403), 2/8/86; WAE.

Stenostola ferrea Schr. (63) Ewden Beck, near Stocksbridge (SK240968), 20/6/87; MLD.

- † *Phytoecia cylindrica* L. (61) Sutton Lane, Allerthorpe Common on umbels (SE7548), 31/5/87; PK. Far to the north of other English records.

Chrysolina violacea Mull. (*62) Ellerburn Bank (SE8584), 10/7/88; RBA. Very rarely seen in Yorkshire.

Hydrothassa hannoveriana F. (*65) Semerwater (SD9185), 20/8/88; RJM and others.

Many specimens in flood refuse. Known from Fulford and Askham Bryan in the early half of the nineteenth century but long ago extinct there. Colonies were found at Malham Tarn in 1958 and Fountains Fell in 1973; also, in 1966, on the Durham side of the Tees (NZ8430), HEF.

Prasocuris phellandrii L. (*65) Semerwater (SD9186), 20/8/88; WAE.

Phyllocteta laticollis Suffr. (*63) Lindrick golf course (SK5482), 18/8/79; WAE.

Galerucella calmariensis L. (64) Camblesforth (SE6525), 21/7/87; WAE. Many records from Askham Bog up to 1949 but otherwise only reported four times in Yorkshire.

Longitarsus brunneus Duft. (*64) Askham Bog, 1984; RGB.

L. oblitteratus Ros. (61) Thornton Ellers (SE7245), 19/8/87; MLD. There is one old record from Hull c. 1900.

Psylliodes chrysocephala L. (*65) Gale Bank (SE0988), 6/10/85; WAE.

Anthribus resinosus Scop. (*61) Skipwith Common, 25/4/87; AW and AS. (63) Langold Holt (SK5685), 14/7/84; SPG.

Rhynchites aequatus L. (*61) Thornton Ings (SE7545), 29/5/87; JHF. Only two previous records in Yorkshire this century of this very handsome beetle.

Apion aestivum Germ. (64) Askham Bog, 21/3/87; WAE. Sixty years since it was last reported in Yorkshire.

A. subulatum Kby. (*61) Newton Mask (SE7050), 1984; WAE.

A. afer Gyll. (*63) Niblung Quarry (SK5481), 5/7/79; WAE. Not reported in Yorkshire since 1917.

A. ononis Kby. (*63) Pieces Bank (SK5491), 6/7/86; WAE.

A. puncigerum Payk. (*63) Rother Valley (SK4681), 21/8/86; WAE.

- Trachyphloeus bifoveolatus* Beck (*61) Southcliffe Common (SE83), 6.87, in pitfall trap; MLD.
- † *T. scabriculus* L. Southcliffe Common, with the above.
- Brachysomus echinatus* Bons. (*63) Sprotborough (SE50), 13/6/87; MLD.
- Limobius borealis* Payk. (*61) Loftsome Bridge, near Howden (SE7030), 28/7/87; PK.
- Pissodes pini* L. (*63) Margery Wood (SE20), 2/7/88; MLD.
- Mesites tardyi* Curt. (62) Hayburn Wyke, 1987; KNA. A persistent colony under bark of various trees, first recorded here in 1868 and later in 1920.
- Acalles ptinoides* Marsh. (*63) Pot Ridings Wood (SE5200), 29/6/88; WAE.
- Hydronomus alismatis* Marsh. (63) Treton, Rotherham (SK429883), 24/7/86; WAE.
- Not reported since 1952, possibly because its foodplants are not easily accessible, water plantain (*Alisma plantago-aquatica*) and arrowhead (*Sagittaria sagittifolia*). It was taken on arrowhead in profusion at Brayton, Selby, by W. D. Hincks and T. B. Kitchen in 1944.
- Notaris bimaculatus* F. (61) Thornton Ellers, 25/7/87; RHD. The only other record is from Bubwith in 1912.
- † *Thryogenes festucae* Hbst. (61) Sunk Island, by Old Hall (TA2716), 17/8/86; WAE.
- Ceutorhynchus picitarsis* Gyll. (63) Pot Ridings Wood (SE5200), 20/7/88; WAE. Second Yorkshire record.
- † *Curculio nucum* L. (63) Shepherd's Plantation, Rotherham (SK4095), 18/6/86; Wath upon Dearne (SK4399), 24/5/86; WAE.
- Scolytus intricatus* Ratz. (63) Hall Dike (SE11), 7/12/84; MLD.
- S. mali* Bech. (*63) Blackmoorfoot, 17/10/84; MLD.
- † *S. rugulosus* Mull. (63) Oak Hill, Goole (SE7222), 16/6/87; PK.

ENTOMOLOGICAL REPORTS FOR 1990-1991

COLEOPTERA: STAPHYLINIDAE (ALEOCHARINAE)

M. L. DENTON

The collecting, identifying and documentation of Yorkshires Aleocharinae continued apace, albeit by a small but dedicated group of specialists. The following list documents their findings since the last report which appeared in *The Naturalist*, 115: 97-102.

Work for various conservation bodies during the period under review revealed the presence of some hitherto unrecorded vice-county and Yorkshire species. Notable in this respect was the mammoth undertaking by the Nature Conservancy Council (now English Nature) on Thorne Moor. This survey, which covered the whole of 1990, culminated in a document entitled 'The Thorne and Hatfield Moors Invertebrate Survey Final Report', written by David Heaver and Brian Eversham. Both R. J. Marsh and the writer were involved in identifying the Staphylinids (including Aleocharinae) for this project.

The identification of the Aleocharinae can be a difficult and daunting task, with a good reference collection being essential. The backing of a knowledgeable specialist is also paramount for the more problematical specimens. It is with this in mind that thanks must be expressed to Mr C. Johnson of the Manchester Museum for his time and efforts in identifying specimens which recorders were finding beyond their capabilities.

For reasons described in the first Aleocharinae report (*Naturalist* 111: 91-96), the sex of the specimen(s) on which identification was based has been indicated; it can be assumed that all specimens were male, unless otherwise stated.

I would like to take this opportunity to thank the small band of dedicated collectors and identifiers for their continued support in documenting the Aleocharinae of Yorkshire. The following people's initials appear in the list that follows: RBA = R. B. Angus; MLD = M. L. Denton; WAE = W. A. Ely; CJ = C. Johnson, RJM = R. J. Marsh; KP = K. Payne and EJS = E. J. Smith.

This list introduces the names of one species new to Britain, 8 new to the county and 37 new to one or other of the vice-counties.

† New county records. * New vice-county records.

- Deinopsis erosa* (Steph.) (61) Wheldrake Ings (SE74), 7/9/89, *Phragmites* bed, RJM. The only previous records are from Hornsea (TA24) in 1903 and Hagg Wood (SE54) in 1963.
- Oligota apicata* Er. (63) Anston Stones Wood (SK58), female, 19/5/85, WAE (teste CJ). The only previous records are from Whitby (NZ81) in 1935, Anston Stones Wood (SK58) in 1935 and Scarborough (TA08) on an unrecorded date.
- O. parva* Kra. (*64) Aberford (SE43), 17/11/90, compost heap, RBA det. CJ.
- O. punctulata* Heer. (*61) Haverfield Quarry (TA32), female, 27/4/91, pondside debris, RBA (teste MLD). (63) Hillsborough (SK38), 7/8/90; female, 25/2/91, EJS. Askham Bog (SE54), Sprotbrough (SE50), Melton Wood (SE50) and Whitley (SE51) have yielded the only previous records.
- O. pusillima* (Gr.) (61) Spurn (TA41), 23/6/90, old straw heap, MLD (teste CJ). The only previous records are from Dalton (SE11) in 1948, Thirsk (SE58) in 1986, Whitley (SE51) in 1989 and Spurn (TA41) on an unrecorded date.
- Myllaena gracilis* (Matt.) (*61) Thornton Ellers (SE74), 7/9/89, pondside debris, RJM (teste CJ). Fisherman's Channel, Sunk Island (TA41), both sexes, 27/4/91, *Typha* bed, RJM. The only previous record was from Hagg Wood (SE54) in 1963.
- M. intermedia* Er. (61) Wheldrake Ings (SE74), 7/9/89, *Typha* bed, RJM (teste CJ). Sprotbrough (SE50), Studley (SE26), Skipwith Common (SE63) and Burniston (TA09) have yielded the only previous records.
- M. minuta* (Gr.) (61) Bubwith Bridge (SE73), 22/5/90, *Glyceria* bed, MLD. Towthorpe (SE86), 26/5/90, Moorhen nest, MLD. The only previous records are from Sprotbrough (SE50) in 1971, Knaresborough Ringing Station (SE35) in 1983, Askham Bog (SE54) in 1987 and Bubwith Bridge (SE73) in 1988 and 1989.
- Gyrophaena bihamata* Thom. (63) Owston Wood (SE51), 11/8/90, decaying fungi, MLD. The only previous records are from Skipwith Common (SE63) in 1915, Thorne Bridge (SE60) in 1969, Thorne Moor (SE71) in 1985 and Rudston (TA16) in 1989.
- † *G. joyoides* Wust. (64) Hetchell Wood (SE34), 25/7/89, in *Amanita rubescens*, RBA det. MLD (teste CJ).
- G. latissima* (Steph.) (*61) Thornton Ellers (SE74), 16/4/90, decaying fungi, MLD.
- G. minima* Er. (*64) Hell Wath (SE36), 2/6/90, fungi under bark, RJM.
- Autalia longicornis* Sch. (*64) Hazelwood Castle (SE43), 6/11/88, decaying fungi, RBA det. MLD. Ringhay Wood (SE43), 17/9/89, decaying fungi, RBA det. MLD. Bishop Wood (SE53), 1/10/89, decaying fungi, RBA det. MLD.
- Cordalia obscura* (Gr.) (64) Cawood (SE53), 10/5/90, pit fall trap in wet meadow, KP det. MLD. The only previous records are from Cloughton (TA09) in 1914, Whitby (NZ81) in 1935, Mag Wood (SE11) in 1983 and the York district on an unrecorded date.
- Tachysa leucopus* (Marsh.) (*64) High Batts N.R. (SE27), female, 18/8/91, river side sand bank, MLD.
- † *Gnypeta ripicola* (Kies.) (63) Margery Wood (SE20), female, 19/7/89, EJS (teste CJ).
- Callicerus rigidicornis* (Er.) (63) Owston Wood (SE51), female, 11/8/90, MLD. Bramley (SK49), Gillfield Wood (SE09) and Newton Ings (SE42) have yielded the only previous records.
- Dacryla fallax* (Kra.) (61) Haverfield Quarry (TA32), female, 27/4/91, pondside debris, MLD (teste CJ). Fisherman's Channel, Sunk Island (TA41), both sexes, 27/4/91, *Typha* bed, RJM. The only previous record was from Spurn (TA41) in 1948.
- Amischia cavifrons* (Sharp) (*65) Aysgarth (SD98), 25/5/91, cow dung, MLD.
- A. decipiens* (Sharp) (*64) Hell Wath (SE36), female, 2/6/90, fungi under bark, RJM.
- Brundinia meridionalis* (Mul. & Rey) (61) Beacon Ponds (TA41), both sexes, 21/6/90,

pondside debris, MLD. Fisherman's Channel, Sunk Island (TA21), both sexes, 27/4/91, pondside debris, MLD and RJM. The only previous records are from Sunk Island (TA21) in 1986 and Spurn (TA41) on an unrecorded date.

Dochmonota clancula (Er.) (61) Bubwith Bridge (SE73), 22/5/90, *Glyceria* bed, MLD det. CJ. Askham Bog (SE54), North Duffield Carrs (SE63) and Guisbrough (SK59) have yielded the only previous records.

Atheta debilis (Er.) (*61) Bubwith Bridge (SE73), 15/12/90, flood refuse, MLD. Wheldrake Ings (SE74), 10/3/91, flood refuse, MLD and RJM.

A. fallaciosa (Sharp) (*63) Thorne Moor (SE71), 10/90, pit fall trap, English Nature det. MLD. The only previous records are from Danby High Moor (NZ70) in 1987 and Skipwith Common (SE63) in 1989.

A. gyllenhali (Thom.) (*64) Cawood (SE53), 9/90, pit fall trap in wet meadow, KP det. MLD.

A. hygrobria (Thom.) (63) Owston Wood (SE51), 11/8/90, MLD. The only previous records are from Bubwith (SE73) in 1931, Ashberry Pastures (SE58) in 1972, Rudding Park (SE35) in 1973 and Blackmoorfoot (SE01) in 1989.

A. malleus Joy. (*64) Studley Park (SE26), 14/7/90, decaying fungi, MLD.

A. palustris (Kies.) (*64) Hell Wath (SE26), 2/6/90, pondside debris, MLD.

A. euryptera (Steph.) (*61) Spurn (TA41), 18/6/90, tide line refuse, MLD det. CJ.

A. harwoodi Will. (*64) Hetchell Wood (SE34), female, 25/7/89, in *Amanita rubescens*, RBA det. MLD. Hell Wath (SE26), 2/6/90, pondside debris, MLD.

A. liturata (Steph.) (*64) Hell Wath (SE36), both sexes, 2/6/90, fungi under bark, RJM. Studley Park (SE26), both sexes, 14/7/90, decaying fungi, MLD. The only previous records are from Roche Abbey (SK58) in 1984 and Duncombe Park (SE68) in 1985 and 1987.

A. atricolor (Sharp) (*65) Felham Ranges (NZ00), female, 18/8/90, in *Polyporus squamosus*, MLD.

† *A. boreella* Brun. (63) Blackmoorfoot (SE01), female, 12/5/90, grass heap, MLD (teste CJ).

A. liliputana (Bris.) (63) Linthwaite (SE01), 10/11/90, by canal side, MLD det. CJ. The only previous record was from Blackmoorfoot (SE01) in 1987.

A. cadaverina (Bris.) (63) Blackmoorfoot (SE01), 9/9/90, grass heap, MLD. The only previous records are from Langsett (SE20) in 1984 and 1985, Drop Clough (SE01) in 1987, Bradfield Dale (SK29) in 1988 and Crooksmoor (SK38) in 1989.

A. sodalis (Er.) (*65) Gunnerside Gill (NY90), 12/5/90, decaying fungi, MLD.

A. tibialis (Heer.) (65) Aysgarth (SD98), female, 25/4/91, RBA det. CJ. The only previous records are from Birkdale Tarn (NY80) in 1913, Mickle Fell (NY82) in 1917, Malham (SD86) in 1954 and 1957, Penyghent (SD87) in 1967 and 1981 and Gaping Gill (SD77) on an unrecorded date.

A. melanaria (Mann.) (61) Spurn (TA41), 19/11/90, sheep dung at Chalk Bank, MLD. Scarborough (TA08), Ravenscar (NZ90) and Spurn (TA41) have yielded the only previous records.

† *A. gilvicollis* Sch. (63) Thorne Moor (SE71), female, 15/3/69, CJ. (62) Runswick Bay (NZ81), 9/6/90, grass heap, MLD det. CJ.

A. aterrima (Gr.) (*65) Aysgarth (SD98), female, 25/5/91, sheep dung, RJM.

A. obfuscata (Gr.) (63) Hillsborough (SK38), 2/10/90, EJS. This is the only known locality for this species in Yorkshire. The only previous records were in 5 and 6/89.

A. parvula (Mann.) (*65) Gunnerside (SD99), both sexes, 12/5/90, RBA (teste MLD). Aysgarth (SD98), both sexes, 25/5/91, sheep dung, RJM.

A. pygmaea (Gr.) (*61) Fisherman's Channel, Sunk Island (TA21), 27/4/91, pondside debris, MLD det. CJ.

A. dadopora Thom. (63) Melton Wood (SE50), females, 10/8/89 and 20/6/90, grass heap, RJM (teste CJ). (*64) Studley Royal (SE26), female, 19/5/89, old hay, RJM (teste CJ). Studley Park (SE26), both sexes, 14/7/90, decaying fungi, MLD and RJM.

The only previous records are from Elland Park Wood (SE12) in 1985. Anston Stones Wood (SK58) in 1985, Melton Wood (SE50) in 1985, 1986 and 1987 and Thornton Ellers (SE74) in 1987.

- A. *zosterae* (Thom.) (61) Wheldrake Ings (SE74), female, 7/9/89, *Phragmites* bed, RJM (teste CJ). The only previous record was from Aughton Ings (SE73) in 1988.
- A. *brunneipennis* (Thom.) (*61) Thornton Ellers (SE74), 16/4/90, pondside debris, MLD. Scampston (SE87), female, 8/6/91, decaying fungi, RJM.
- A. *coriaria* (Kra.) (*61) Towthorpe (SE86), 26/5/90, Moorhen nest, MLD.
- A. *fungicola* (Thom.) (63) Blackmoorfoot (SE01), 30/3/90, grass heap, MLD. (*64) Studley Park (SE26), 14/7/90, decaying fungi, MLD. The only previous records are from Goathland (NZ80) in 1935, Mulgrave Wood (NZ81) in 1936 and Blackmoorfoot (SE01) in 1989.
- A. *ravilla* (Er.) (*61) Bubwith Bridge (SE73), both sexes, 16/4/90, *Glyceria* bed, MLD. Aughton Ings (SE63), both sexes, 16/4/90, sheep carrion, MLD.
- A. *repanda* (Mul. & Rey) (*65) Felham Ranges (NZ00), 18/8/90, in *Polyporus squamosus*, MLD.
- † A. *strandella* Brun. (61) Spurn (TA41), 18/6/90, tide line refuse, MLD det. CJ.
- † A. *cauta* (Er.) (64) Ringhay Wood (SE43), 20/10/89, decaying fungi, RBA det. CJ.
- A. *marcida* (Er.) (*64) Ringhay Wood (SE43), female 22/10/89, decaying fungi, RBA det. MLD. Temple Newsome (SE33), both sexes, 12/11/89, decaying fungi, RBA det. MLD.
- A. *nigripes* (Thom.) (*62) Robin Hood's Bay (NZ90), 28/7/91, decaying seaweed, RBA det. MLD.
- A. *aeneipennis* (Thom.) (= *picipennis* Mann.) (63) Strines (SK29), female, 2/9/89, decaying fungi, EJS (teste CJ). The only previous records are from Abbey Brook (SK19) in 1987 and Bradfield (SK29) in 1988.
- A. *setigera* (Sharp) (*65) Aysgarth (SD98), 25/5/91, cow dung, MLD.
- A. *marina* (Mull. & Rey) (61) Spurn (TA41), 30/5/90; both sexes, 19/6/90; female, 20/6/90; both sexes, 23/6/91, tide line refuse, MLD; female, 25.6.91, tide line refuse, RJM. Beacon Ponds (TA41), both sexes, 24/6/90, pondside debris MLD. Fisherman's Channel, Sunk Island (TA21), both sexes, 27/4/91, pondside debris, MLD. The only previous records are from Welwick (TA32) and Spurn (TA41) on unrecorded dates.
- Phloeopora testacea* (Mann.) (*64) Bishop Wood (SE53), both sexes, 28/5/89, under bark, RBA det. MLD.
- Ilyobates nigricollis* (Pk.) (*63) Langsett (SE20), not sexes, 17/6/90, leaf litter, EJS det. CJ. Roundhay Park (SE33), Askham Bog (SE54) and Scarborough (TA08) have yielded the only previous records.
- † *Calodera protensa* Mann. (64) Cawood (SE53), female, 5/90, pit fall trap in wet meadow, KP det. CJ.
- Deubelia picina* (Aub.) (*61) Wheldrake Ings (SE74), 10/3/91, flood refuse, MLD (teste CJ). The only previous records are from Collingham (SE34) in 1917 and Duncombe Park (SE68) in 1987.
- Aleochara albovillosa* Bern., (*65) Felham Ranges (NZ00), 18/8/90, dead rabbit, MLD. Aysgarth (SD98), 25/5/91, cow dung, MLD.
- † A. *binotata* Kra. (61) A single female found at spurn (TA41) in July 1963 by R. C. Welch was originally described as *A. verna* Say. (*The Entomologist*, **102**: 207-209). The true identity of the specimen has now been correctly determined and further details can be gleaned from the *Entomologist's Record*, **102**: 225-226. This species can now be added to the British list, whilst *A. verna* Say. should be deleted.
- A. *grisea* Kra. (61) Spurn (TA41), female, 19/6/90, tide line refuse; both sexes 23/6/90, from a long dead Roe Deer, MLD. Saltburn (NZ62), Redcar (NZ62) and Spurn (TA41) have yielded the only previous records.
- † A. *inconspicua* Aub. (63) Thorne Moor (SE71), 10/90, pit fall trap, English Nature det.

CJ. Further information regarding this rare insect can be had from British Red Data Books: 2. Insects.

- A. *intricata* Mann. (*63) Shireoaks Quarry (SK58), 5/6/85, WAE det. CJ. The only previous records are from Whitby (NZ81) in 1920, Kearby (SE34) in 1937, Huntington Wood (SE65) in 1948, Sunk Island (TA21) in 1986 and Spurn (TA41) on an unrecorded date.
- A. *spadicea* (Er.) (*64) Cawood (SE53), 10/8/90, 11/90, 12/90 and 1/91, pit fall trap in wet meadow, KP det. MLD.

BOOK REVIEWS

Birds and Pastoral Agriculture in Europe edited by D. J. Curtis, B. M. Bignal and M. A. Curtis. Pp. 137. Joint Nature Conservation Committee and Scottish Chough Study Group, Peterborough, 1991. £12.50 paperback.

The Conservation of Lowland Dry Grassland Birds in Europe edited by P. D. Goriup, L. A. Batten and J. A. Forton. Pp. 136. Joint Nature Conservation Committee, Peterborough, 1991. £10.00 paperback.

Both items available post free from JNCC, Monkstone House, City Road, Peterborough PE1 1JY

These two reports of symposia, held respectively at Port Erin, Isle of Man, 26-30 October 1990 and the University of Reading, 20-22 March 1991, cover a range of topics which are remarkable dissimilar and complementary, despite the overlap implied by their titles. *Birds and Pastoral Agriculture in Europe* is concerned with detailed, academic studies reporting largely recent research and analyses. There are 30 papers, mostly rather short, and despite the title, there is a strong bias towards the British Isles. Four concern Choughs (Cornish and Alpine) and the relationship between grazing and their invertebrate food supply, while Black Grouse, Corncrake, Hen Harrier, Golden Eagle and Hooded Crows (and carrion supply) are treated in other papers. Most of the papers are concerned with more general aspects of pastoral agriculture, including patterns of changing use, the value of traditional management, and the likely effects of various agro-political changes (ESAs, LFAs, the EEC's birds directive, etc.).

The report of lowland dry grasslands is more specifically targeted, and is consequently a better review; its prime concern is the extensive dry grasslands and their characteristic avifauna, especially Little Bustard, Great Bustard, Lesser Kestrel and Sociable Plover. Other species associated with these (eg Montagu's Harrier, Stone Curlew, various larks, pipits and wheatear) also warrant concern, and justify a modest British participation, but this is a much more international volume. Its major interest is perhaps in the eight status reports, from Spain, France, Italy, Austria, Hungary, USSR, Turkey and Britain, which include also discussion of the practical conservation measures which are being undertaken. As in the other report, there are in addition more general papers on the distribution of the habitat type, and on the agro-political implications of land use change, conservation and agricultural legislation. With only 16 papers in virtually the same number of pages (136-137), each of the contributions is rather longer and, to my mind, more valuable.

Both reports contain much of interest to any ornithologist or conservationist, particularly one concerned to learn about the likely impact of agricultural policies on grassland birds. The "dry grassland" report is a better review of its more limited subject, while "pastoral agriculture" gives much more information on the British scene.

Waders Breeding on Wet Grasslands edited by H. Hotker, N. C. Davidson and D. M. Fleck. *Wader Study Group Bulletin*, No. 61, Supplement, April 1991. Pp. 107. Joint Nature Conservation Committee. £10.00 post free from JNCC. Monkstone House, City Road, Peterborough PE1 1JY.

The Wader Study Group is an association of amateurs and professionals from all parts of the world interested in the *Charadrii* (waders or shore birds). The publication reviewed is the report of a conference convened at Ribe, Denmark on 23 September 1989. The excellent papers are supported by copious charts, distribution maps, statistics and references. The estimated current breeding populations of eight species of waders are given for all the countries of the European community (with the exception of Greece). The individual papers cover meadow (wet grasslands) species in the Netherlands, Belgium, Portugal, West Germany, France, Denmark, Italy, Ireland, Spain, Luxembourg and Great Britain and discuss current knowledge and population trends. Generally there is little cause for optimism unless conservation policies can be implemented for the common species as well as for the rarer species, eg the Black-tailed Godwit in Britain and the Snipe in Spain.

Chapter 4 *Discussion and Recommendations* sets out the measures which need to be implemented with some urgency since the remaining populations depend upon the management of man-influenced, semi-natural habitats; in the case of some species such as the Black-tailed Godwit (*Limosia limosa*), the future of the whole of the European population depends upon these semi-natural habitats.

The nine recommendations are based on current research and they are translated in full into 10 languages.

They include: safeguarding all remaining semi-natural wet grasslands; financial support where appropriate and the withholding of financial support where there is a threat to the habitat; control of water abstraction where this could lower the water table; control of grazing; control of the use of inorganic fertilisers.

Recommendation 9 sets out a detailed management programme for the wetlands.

The Editor is to be complimented on the excellent production and sets a standard that must impress all conservationists in whatever field they work

LM

The Moths and Butterflies of Spurn by B. R. Spence. Pp. 122. From B. R. Spence, Spurn Bird Observatory, Kilnsea via Patrington, Hull HU12 0UG. Cheques for £5.50 (incl. p. & p.) to Spurn Bird Observatory.

This is the first list of the lepidoptera of the YWT Spurn Peninsula. It is attractively presented and represents an immense amount of work by the warden, Barry Spence, who has been keeping records since 1969. The softback book has a fine colour photograph of the Comma by Peter Crowther on the front cover. In addition his plume moth illustrates the back cover together with John Cudworth's Reed Dagger. There is a short introduction, a plant list, references, a map and five pages of black and white photographs. These show habitats, moth traps and a group of YNU entomologists. The Systematic List (112 pp.) records 611 butterflies, 'macros' and 'micros'. First records are always given and many more details added for the less common species. Of the total Yorkshire list (Butterflies and Moths of Yorkshire 1989), 32% have turned up at Spurn, but they are not all breeding species. As well as his own light trap records Barry Spence includes, among others, published YNU records and especially mentions the group of entomologists who undertook the first systematic survey over several post-World War II years. The names and order follow Bradley and Fletcher 1986 and are first given in Latin followed by English where applicable. Every Yorkshire naturalist, and many national and international ones, visit Spurn and only by having such a reference book as this can one experience the thrill of recording for the first time one of the remaining 68% unlisted Yorkshire species.

JP

A Natural History of the Lakes, Tarns and Streams of the English Lake District by Geoffrey Fryer. Calligraphy by Sharon Murphy. Pp. 368 with 800 illustrations. Freshwater Biological Association, Ambleside. 1991. £18.00 including postage from FBA, The Ferry House, Far Sawrey, Ambleside, Cumbria LA22 0LP.

All the publications of the Association are renowned for their high standard of text and illustrations and this fine book follows in the same tradition. The author, a Fellow of the Royal Society since 1972, was formerly on the staff of the Freshwater Biological Association and is now an Honorary Professor at the University of Lancaster. The format is unusual but pleasing, the text being entirely handwritten by Sharon Murphy.

The book sets out to tell in a simple way how the lakes and tarns of the English Lake District were formed. There is a profusely illustrated account of the plants, animals and the wild life of not only the tarns but also of the streams and the mountain springs that feed them. The macro-fauna and the microscopic flora and fauna are described, together with their complex inter-relationships. However, this is not a technical book for professionals (although one cannot fault its scientific content); it is written by a dedicated field naturalist for all who enjoy the countryside, as well as being a mine of information for students and amateur naturalists alike.

Although I have had a lifelong interest in freshwater biology, many of the author's revelations came as a complete surprise to me, especially the breeding behaviour of some of our fishes and the observations of the life cycles of certain of the caddis flies and the *Ephemeroptera*. There is nothing in this fascinating book which is outdated; turning to the Crayfish, our largest crustacean, I found that the author had fully described the serious threat to our native species posed by the fungus carried by the foreign species recently introduced into this country for commercial purposes.

Whatever branch of natural history one may be interested in, whether it be botany, entomology, birds or ecology, this book will provide something new; moreover, although it deals primarily with the Lake District, much of the subject matter is applicable to the whole of the North of England (and to many other regions too).

The author has gone to great pains to ensure the accuracy of the text, the drawings (many of these being his own work) and his observations yet at the same time to make it very readable; it has given me much pleasure. It is surely destined to be a classic work of natural history.

LM

Biogeography of Mediterranean Invasions edited by R. H. Groves and F. di Castri. Pp. 485, Cambridge University Press. £65.00.

Europeans tend to associate the word 'mediterranean' exclusively with their own Mare Internum and the surrounding lands to the north and south. This book has a refreshingly world wide perspective on the regions with a mediterranean climate, including those of California, central Chile, southern Africa and southern and south-western Australia as well. All have in common a generally warm climate with damp winters and hot dry summers, a pattern which arose in the Pleistocene and has continued in these places to the present. It is of great interest to biogeography and to the study of evolution in general to know the extent to which similar climatic patterns dictate the floral and faunal composition of isolated regions and how much their evolution differs because of the particular combinations of species available to exploit them. Here is a multi-authored book concerned particularly with the fate of invading species, but covering all the regions and using the data to assess the reasons for the similarities and differences between them. It begins with a historical review and ends with a summary of conclusions. Between, there are sections on higher plants, mammals and birds, these being the most apparent and easily studied groups, and on specific applied aspects. Much detailed information is presented and some generalizations can be made. On the whole, the regions tend to be resistant to invasions and the most invaded have been the subject of repeated introductions, for example, those by the

"Acclimatization societies" in colonial Australia.

Sometimes the invaders have a severely degrading effect, such as the rabbits and goats on Juan Fernandez. Others become integrated as a new and harmonious ecosystem, such as the *Acacia caven* savanna of Chile with its mixture of European animals and grasses. Success can be related to some extent to presence or absence of adjoining regions from which immigrants could have been recruited over long periods of time. Thus, in Australia and South Africa, which do not have more temperate biotopes to the south of them, invasions by conifers are more common than they are in other mediterranean locations. Repetitive disturbances are important in creating the conditions for replacements and, naturally enough, association with man has played a crucial part in determining the more recent patterns of invasion.

Perhaps because of the international nature of the contributions, the editors have done a thorough job of integration, which makes the book a particularly valuable introduction for the non-specialist. At £65, however, it is not likely to have a large sale outside libraries. How often that has to be said. If a paperback would lower the price most readers would probably value greater purchasing power over the undoubtedly handsome hard covers possessed by this volume.

LMC

Bioindicators and Environmental Management edited by D. W. Jeffrey and B. Madden. Pp. xiii + 458, with numerous line drawings, graphs and tables. Academic Press. 1991. £35.00

This volume is based on the Sixth International Bioindicators Symposium held at Trinity College, Dublin in September 1990. It contains 35 papers which vary in quality and style: most relate to specific organisms and/or locations, but a few contain review material and are therefore more useful in a wider context. The papers are categorized under four headings (Bioindicators, Industry and Administration; Environmental Radioactivity and Biomonitoring of the Chernobyl Accident; Monitoring Long Term and Large Scale Environmental Trends; Basic Research in Biomonitoring), but other than the three contributions on Chernobyl, there appears to be little to justify the order. There is a preponderance of papers (23) devoted to aquatic systems; as well as the Chernobyl papers, five are concerned with terrestrial plants, three with terrestrial animals, and one with landscape ecology.

Environmental scientists and applied biologists will find much of interest, particularly with regard to the use of bioindicators in monitoring environmental trends, in environmental impact assessments, and in environmental management.

MRDS

What is Life? with Mind and Matter and Autobiographical Sketches by Erwin Schrödinger. Pp. viii + 184 with line drawings. Cambridge University Press. 1992. £5.95 paperback.

What is Life? was first published in 1944, *Mind and Matter* appeared in 1958 and *Autobiographical Sketches* appears here, in translation, for the first time. Schrödinger in the penultimate paragraph of the *Sketches*, which occupies 17 pages, stated 'I must refrain from drawing a complete picture of my life'! After reading these few pages one must regret his restraint.

Mind and Matter is 60 pages of conjecture as to how the physical 'world' gives rise to qualitative perceptions, eg of colour, and to consciousness – matters which physicists cannot explain. Now, as in 1958, much remains speculative – a matter for erudition, as it was in the time of Spinoza, and later in that of Gustav Theodor Fechner: these philosophers Schrödinger quotes (not necessarily with agreement); interestingly, the writings of both foreshadow the mystical GAIA concept, and fall back ultimately on unreason rather than providing explanations.

As a biologist, I was interested particularly in the 1944 section of the book in which Schrödinger addressed the problem of 'How can the events *in space and time* which take place within the spatial boundary of a living organism be accounted for by physics and chemistry?' The answer is still as elusive at the level of quantum theory as it appeared to Schrödinger, but at the chemical level there is less mystery. The section is truly historical insofar as the significance of nucleic acids in heredity was unknown: proteins were at that time credited as the genetic material. Schrödinger speculated on 'a well ordered association of atoms, endowed with sufficient resistivity to keep its order permanently', as 'the only conceivable material structure that offers a variety of possible ("isometric") arrangements sufficiently large to embody a complicated system of "determinations" within a small spatial boundary'.

Unfortunately some of the biology was so over-simplified as to be completely inaccurate even for the state of knowledge at the time; examples of such over-simplification include a diagram of two single-stranded chromosomes indulging in 'crossing-over' (*sic*), and the suggestion that if it were supposed that he, Schrödinger, 'carries . . . a recessive detrimental mutation . . .' and . . . that his wife does not, 'then half of our children (*sic*) . . . will also carry it'. One could go on. But, disarmingly, Schrödinger wrote: 'I have to summarize the present state of knowledge in a subject of which I am not a master . . . and I apologize, particularly to any biologist, for the dilettante character of my summary'. The problem for any biologist young enough not to have endured pre-DNA genetic speculation, and not well versed in cytogenetics will be to know what is biologically reliable. A problem for most readers will be to understand the chapter on 'quantum mechanical evidence'. In 1944 the stability of the allele associated with Habsburg lip, 'kept at a temperature around 98°F . . . unperturbed by the disordering tendency of the heat motion for centuries', is mentioned under the heading 'Permanence Unexplainable by Classical Physics', and is followed by 'Explicable by Quantum Theory'. The view that mutation is synonymous with isometric change in a 'huge molecule' is not tenable today. What relationship does quantum theory bear to genetics, if the genetic material does not mutate by quantum jumps as Schrödinger postulated? Roger Penrose in his short Foreword should have provided a clue.

On the cover of the book is a suggestion (ludicrous, especially in the profit-oriented climate of science in the 1990s, and with the parlous financial state of many students) that 'this combined volume should be *compulsory* reading for all students who are seriously concerned with the truly deep issues of science' (my italics). Addition of footnotes explaining developments in relevant biological fields since 1944 might have been helpful, although the undoubtedly elegance of Schrödinger's presentation might thereby have been compromised.

DJH

The Correspondence of Charles Darwin. Volume 7. 1858-1859 edited by Frederick Burkhardt and Sydney Smith. Pp. xxxviii + 671 b/w photographic plates. Cambridge University Press. 1991. £35.00.

This, the seventh volume in this large-scale publishing undertaking (and the last under the editorship of Sydney Smith who died in 1988), covers some of the momentous events in Darwin's life, including the correspondence arising from his receipt of Wallace's letter of June 1858, indicating that he too had independently formulated a theory of natural selection, through to the publication of Darwin's theory a year later. The gathering together of this wealth of correspondence, a large proportion of which has not been published previously, illuminates a sequence of events which was to have the most far-reaching consequences of any natural history discovery. It makes fascinating reading.

As well as containing the usual wealth of textual information in the form of manuscript alterations and comments, bibliography, biographical register and detailed index, there are 36 pages of supplementary letters for the period 1821-1857 which have been located or re-dated since the publication of the first six volumes of *Correspondence*.

MRDS

An Illustrated Record of Ordnance Survey in Ireland. Pp. iv + 104. Published jointly by The Ordnance Surveys of Ireland and Northern Ireland, Dublin. 1991. £5.00 from The Director, OSNI, Colby House, Stranmillis Court, Belfast BT9 5BJ

This work provides a fascinating insight into the history of and methodology employed in the cartographical representation of Ireland since the end of the 16th century, placing emphasis on the Ordnance Survey which commenced in 1824 under the direction of Lt. Col. Thomas Colby and included the world's first large-scale mapping of an entire country. This delightfully produced book is complemented by outstanding colour plates illustrating a wide variety of maps throughout this period and the field survey work and mapping techniques used in their production.

MRDS

Clematis: The Queen of Climbers by Jim Fisk. Pp. 160, with full colour photographic illustrations. Cassell. 1991. £9.95 paperback.

Jim Fisk is one of the world's acknowledged experts on what many consider to be the finest of all climbing plants. This is the first paperback edition of his classic work on the genus *Clematis*, reprinting the third edition of 1989. The author covers all aspects of *Clematis* cultivation clearly and authoritatively, and supplies a most valuable account of species and hybrid varieties. Many of the latter were bred at his own nursery and there is much of interest on their raising in the (rather overlong) chapter on this establishment. The photographs are excellent, but their quality is not matched by some of the few line drawings, which do not adequately illustrate the points being made.

VAH

Designing your Garden by Roger Sweetinburgh. Pp. 96, plus 8 pages of full colour photographic plates. Ward Lock. 1991. £9.95 paperback.

A most useful work, full of good ideas simply expressed, which should enable even the rankest novice to achieve an interesting and attractive garden layout.

Small-garden Pools by Philip Swindells. Pp. 96. Ward Lock. 1991. £2.99 paperback.

An unpretentious, practical and modestly priced guide which provides all the basic information likely to be needed by anyone planning to construct or install a small pond. Brief guidance is given on suitable plants and fauna for stocking the finished pond and there is also a chapter on pool maintenance.

Summary of National Vegetation Classification. Woodland Descriptions by A. M. Whitbread and K. J. Kirby, Pp. 37. Joint Conservation Committee, Peterborough, 1992. £3.50 paperback, post free from JNCC Monkstone House, City Road, Peterborough PE1 1JY

This publication is a summary of the woodland communities described in the book edited by John Rodwell and is intended as an '*aide memoire* to assist surveyors in the field'. The summary diagrams and dendograms are a great help to a field worker in keying out a stand of vegetation and show the relationships between the 18 woodland communities and their sub-communities described in this volume. Each community is covered by three or four paragraphs describing the soils on which it occurs, its physiognomy and characteristic species composition. I would recommend this for any field ecologist, but the A4 format of the booklet will not stand up to the rigours most ecologists put their fieldbooks through.

ADH

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Editors: S. L. Sutton and H. E. Beaumont

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THE NATIONAL MUSEUM OF WALES

is pleased to announce the publication of the following:

Mosses and Liverworts of Woodland: A Guide to Some of the Commonest Species.

By A. Roy PERRY.

March 1992. ISBN 0 7200 0362 8

41 pages, 10 colour and 29 black and white photographs, 22 text figures and 29 distribution maps.

Paper (laminated cover) £2.95

The Museum's new publication, *Mosses and Liverworts of Woodland*, is a photographic guide to some of the commonest species. In its short introduction the general life history and structure of these beautiful plants is sketched out, and the differences between mosses and liverworts explained. A series of black and white, and colour, photographs, some accompanied by drawings, illustrate 39 species. Through these, together with short descriptions of the plants as observed in the field, and distribution maps, it is hoped that this pocket-sized book will make mosses and liverworts more accessible and introduce beginners to this fascinating group of green plants.

This book is available from the Bookshop, National Museum of Wales, Cathays Park, Cardiff, CF1 3NP, UK. Price £2.95 (£3.45 by post inland, £3.75 EC, £3.95 non EC).

72

July — September 1992

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2853

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**The Humber Wildfowl Refuge: an experiment in wildfowl
conservation — Brian S. Pashby**

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— A. A. Wardhaugh**

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Manuscripts (two copies if possible), typed double-spaced on one side of the paper only with margins at top and left-hand at least 2.5cm wide, should be submitted. Latin names of genera and species, but nothing else, should be underlined. S.I. Units should be used wherever possible. Authors must ensure that their references are accurately cited, and that the titles of the journals are correctly abbreviated. Volumes of *The Naturalist* for the years 1886 to 1975 have been retrospectively numbered 11 to 100 to accord with numbering before and after this period (see YNU *Bulletin* no. 3, pp. 21-22 1985); please cite these volume numbers in all references. Tables and text-figures should be prepared on separate sheets of paper. Drawings and graphs, drawn about twice the linear size they are to appear, should be in jet-black Indian ink, and legends should not be written on the figures. **Publishable manuscripts not conforming to the above requirements will be returned for alteration.**

Photographic Plates

Readers of *The Naturalist* will have noticed that the number of photographic illustrations has increased in recent years. Good clear photographs, suitably captioned, to accompany articles or as independent features, such as the bird portraits by Arthur Gilpin in recent issues, are always welcome.

To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record his deep appreciation of this imaginative gesture.

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THE HUMBER WILDFOWL REFUGE: AN EXPERIMENT IN WILDFOWL CONSERVATION

BRIAN S. PASHBY

Due to Brian Pashby's untimely death, this Presidential Address, based on his almost completed manuscript, was presented by Derek Cutts to the 130th Annual General Meeting of the Yorkshire Naturalists' Union in Beverley on Saturday, 7 December 1991. Shirley Pashby has prepared her husband's manuscript for publication with the help of Jean and Eric Chicken and John Cudworth.

Three things influenced the choice of subject for my address. First of all, any moves which involved the Union in the establishment of a sanctuary for wildfowl on the Humber were made through the Union's Protection of Birds Committee which this year has celebrated its centenary. Secondly, practically nothing has been said or written within Union circles about a course of action which was, thirty-six years ago, a pioneering effort in conservation in which some of its members took part. Finally, for most of my ornithological life I have been an "estuary" man. My talk falls into three main sections. After an introduction, (1) a quick look at the Humber Estuary with the main emphasis on the Upper Humber, (2) the events leading up to the establishment of the Refuge and (3) a review of some of the species of waterfowl occurring there.

I want to go back to the 1950s and the days of Ralph Chislett who was regarded as the voice of Yorkshire ornithology. His only reference to a wildfowl sanctuary on the Humber appeared in the Y.N.U. Ornithology Report for 1954 published in *The Naturalist* for 1955. In the classified list under the species-heading Grey Geese he wrote: "At a meeting of representatives of the Nature Conservancy, the Wildfowlers' organisations and the Lincolnshire and Yorkshire Naturalists' Unions¹ a defined area of sanctuary for geese in the Upper Humber was agreed." A further brief statement was made by him in the *Naturalist* for 1956 in the Y.N.U. Annual Report for 1955 under the Ornithology Interim Report: "An area of the Upper Humber has been declared a sanctuary for birds and it is hoped the geese will benefit. The Humber Wildfowl Refuge Committee is composed of six representatives each from wildfowlers' and from naturalists' organisations in Lincolnshire and Yorkshire. The meetings were attended by our officials. Our thanks are due especially to Mr. E. M. Nicholson, the energetic Director of the Nature Conservancy".

So let us have a look at the Humber with the location of the Refuge (Fig. 1). It starts at the confluence of the Rivers Ouse and Trent and continues for 62 km or about 38½ miles to Spurn Point. As estuaries go, it is relatively narrow, being no more than 12 km or 7½ miles just east of Grimsby near its widest part. Its catchment area covers about a fifth of the land area of England, as a result of which it receives the industrial and domestic discharge of at least six large conurbations – Leeds, Bradford, Sheffield, Derby, Nottingham and Birmingham, and then lower down from Hull. It is a stretch of water in which there are many navigational hazards in the form of numerous sandbanks; no problem if these are stabilised, but when shifting around or altering size or shape as they frequently do, they make the Humber one of the most intricate for the navigation of sea-going vessels. The responsibility for maintaining safe navigation was that of the Humber Conservancy Board, and it is important to bear in mind that all matters concerning the Humber are subordinate to this.

It is the winter home of thousands of visiting waterfowl but there is a considerable difference in the way the two main families of birds occupy the available habitats. The

¹ The Lincolnshire Naturalists' Trust and the Yorkshire Naturalists' Union

main wader population occurs in the lower estuary where the birds feed and roost. The main wildfowl population is in the upper estuary where some species find food as well as roosting sites while others use the area for roosting only. The Upper Humber (Fig. 2), the

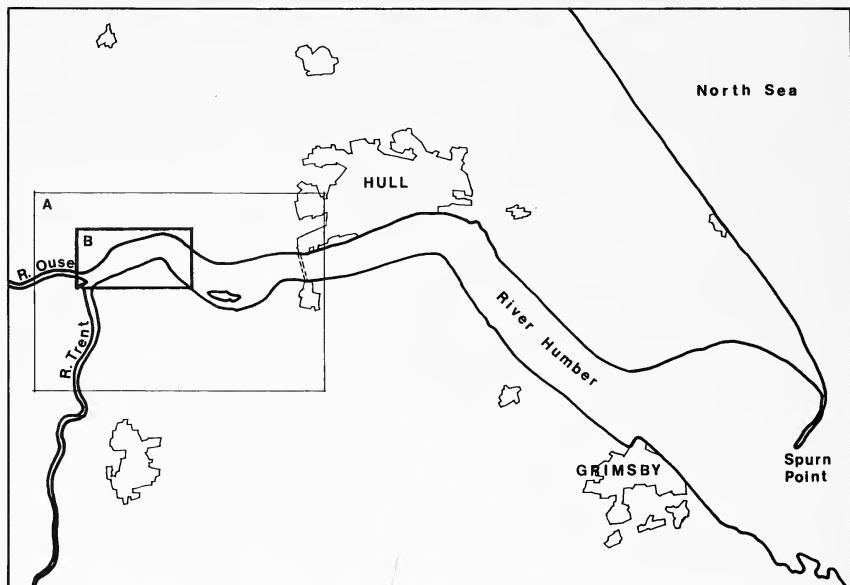


FIGURE 1

River Humber. A. Location map (Fig. 2) of the Upper Humber Flats and Marshes S.S.S.I.; B. Location of the Humber Wildfowl Refuge.

area mentioned by Ralph Chislett in the references quoted earlier, is dominated at low tide by two large areas of sand and mud-flats, the Redcliff Sand/Read's Island/Pudding Pie Sand complex, and a little further upstream, the Whitton Sand. A second feature is Broomfleet Island and a third, which has had a profound effect on what we see today but which does not catch the eye until we get closer to it, is the training wall at the confluence of the Ouse and Trent.

The sandbanks of the Upper Humber have long been known as roosting sites for the Pink-footed Goose (*Anser brachyrhynchus*), though early writers on our county's avi-fauna did not name any particular one of them. It is quite likely that the geese used them all, depending on which was most convenient, and of course the temporary loss of any of them through erosion or undue disturbance would make a move necessary. Indeed, this has occurred during our own lifetimes; for instance, during the early 1930s the Aire and Calder Navigation Co. built the said training wall at the confluence. This was to preserve the port of Goole, which was in danger of becoming isolated because of the silting-up of the Ouse at the western end of the Whitton. This training wall alleviated the problem but immediately caused the build-up of the area behind the wall, so that by the early 1940s, Blacktoft Sand, once an area of open mud and a goose roost, was now a saltmarsh with reed beds and grazing cattle. The main roosting site at this time was on a sandbank which lay on the northern side of Read's Island and this bank has always been subject to erosion. There is no pattern whatever in the build-up, consolidation or eventual erosion of this bank. It can be present for years, then after disappearing and rebuilding may only last for months, and it was the loss of this site in the early 1950s which caused the geese to move to the

Whitton and led indirectly to the establishment of the Refuge. It was in this setting then that both birdwatcher and wildfowler would look forward to the arrival each year of the first Pink-feet in mid-September, just a handful at first but with numbers increasing rapidly until well into October, when the spectacle of thousands of geese taking off at morning flight could be enjoyed, bound for feeding areas either on the Yorkshire or Lincolnshire Wolds, often as far as Huggate c. 30 km away. There the birds would feed on the stubbles before returning in mid-afternoon to the security of the roost.

Until the Protection of Birds Act of 1954 there had been very little legislation on the protection of wildfowl. Such private restrictions as there were banning the taking of wildfowl had generally been in order to ensure a good supply for the landowners, which in some cases were religious houses which depended a great deal on wildfowl as a source of food. The first measures giving some kind of protection were contained in the Wild Birds Protection Act of 1880 in which a close season was fixed for the first time, the idea being that it would help to ensure a successful breeding season with the total of young birds reared outnumbering the total taken during the previous winter. From a practical point of view this was probably all that was necessary, but the Act had many anomalies and loopholes, and it was not until 1939 that a new Act, called the Wild Birds (Ducks and Geese) Protection Act, came into being. This resulted in the extension of the close season, but some of the omissions in the previous Act were also put right.

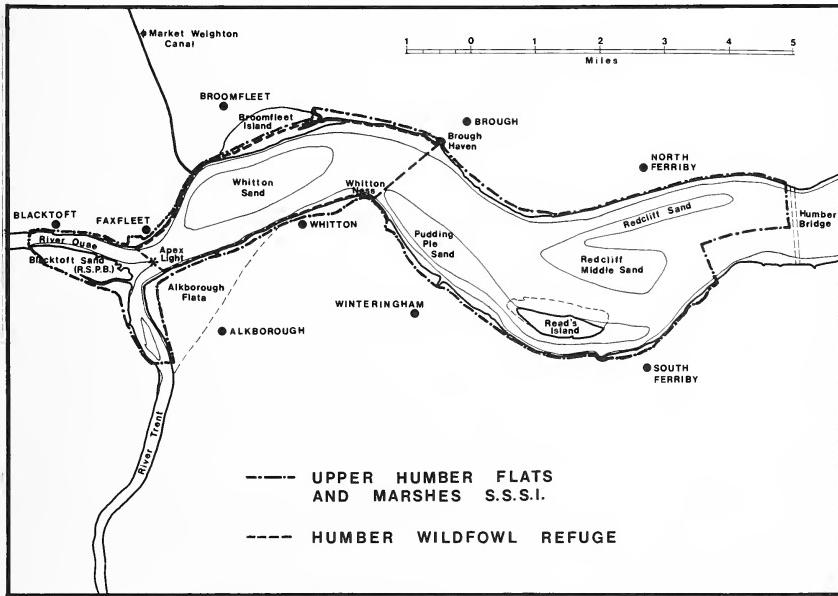


FIGURE 2
Upper Humber Flats and Marshes S.S.S.I.

However, social and economic changes following the Second World War brought about changes in shooting pressure, more people wishing and being able to afford to shoot. As far as the Humber geese were concerned, this in itself was not a great danger provided that two essential conditions for the welfare of the geese were maintained: a good food supply and, even more important, a safe place to roost. Both East Yorkshire and North Lincolnshire provided the first of these in plenty and the Upper Humber mud-flats the second, that is, until the erosion of the Read's Island bank where access had been almost impossible. The

main drawback to the Whitton Sand was that such access was possible. Inevitably, various activities combined to cause disturbance on and around this roost. Decoys and calls were being used as were both duck-punts and motor-boats. Worst of all, some shooters were "digging-in" — actually digging barrels into the mud, from which they could remain concealed while waiting the arrival of the geese at the roost. Many thought this to be quite legal, but it was in fact contrary to the bye-laws of the Humber Conservancy Board and in any case was regarded as most unethical by the majority of sportsmen. This plus allegations of over-shooting and disturbance on Read's Island led to the involvement of the Lincolnshire Naturalists' Trust in campaigns for better protection for the geese. The Nature Conservancy, at the Trust's suggestion, took up the question of shooting on Read's Island with the Humber Conservancy Board. The Trust's second suggestion was that the Conservancy should seek agreement with the Wildfowlers' Association of Great Britain and Ireland (W.A.G.B.I.) as to the establishment under the new Bird Protection Act of a statutory refuge covering the Whitton Sand area, but omitting Read's Island itself. Meanwhile, on the north shore, wildfowlers were just as concerned at the disturbance, particularly when one local individual started to bring American military personnel with repeating shotguns to the area. Here too, suggestions for a refuge were put to the Conservancy; these proposed, ideally, three sites: the Whitton Sand, Pudding Pie Sand and Read's Island, in that order of importance.

At the same time, national interest in wildfowl conservation had been stimulated by the activity of Peter Scott and his new Severn Wildfowl Trust, as well as by protection legislation under discussion concerning the Protection of Birds Act. As part of these, a committee was recommending the setting up of a network of wildfowl refuges throughout the country. It was leaks and rumours from these sources which led to the lowering of relations between the general body of wildfowlers and naturalists. This was as obvious in the Humber area as it was anywhere else. The bitter feelings engendered by all these discussions and rumours were simply due to misunderstandings of what either side wanted to achieve. For instance, many wildfowlers thought that the naturalists wanted to stop them shooting on the shore, but this was not so. In practice, goose mortality through accepted shooting codes was negligible on the Humber. Feeding parties on the Wolds, if shot at, would simply move on elsewhere, and at both morning and evening flight they would gain height when approaching the shore, to such good effect that they were out of range.

As a result of the approaches from both sides of the Humber and also his own mediating skills, Max Nicholson, then Director General of the Nature Conservancy, called a meeting for 15th January 1955 to be held at the offices of the Humber Conservancy Board in Hull. Four officers of this Board were present as well as representatives of the following local organisations:- the Hull & East Riding Wildfowlers' Association; the Holderness & Humber Wildfowlers' Association; the North Lincolnshire Wildfowlers' Club; the Lincolnshire Naturalists' Trust; the Yorkshire Naturalists' Union and the tenants of Read's Island. National bodies represented were the Wildfowl Trust and W.A.G.B.I. Some familiar names of the past and present were J. Atkinson-Willes; Dr Wilfred Taylor; George Ainsworth; A. E. (Ted) Smith; R. K. (Dick) Cornwallis; J. W. ("Judge") Johnson (a remarkable man and a towering figure in W.A.G.B.I.), and, as observer for the British Field Sports Society, Colonel J. K. Stanford. Also present as an observer while in this country was Professor Gustav Swanson of Cornell University, U.S.A., the eminent American authority on wildfowl conservation. At this meeting there was general agreement that (1) the situation at Read's Island should be left to continuing discussion between the tenants of Read's Island and the Nature Conservancy; (2) the question of a refuge on Pudding Pie Sand no longer arose as it had disappeared and (3) proposals put forward by the wildfowling bodies for a strict refuge on Whitton Sand which would have legal status on which no shooting would be allowed should be endorsed. It was also agreed that a local joint committee should be set up consisting of two representatives each from the local organisations listed above plus the Yorkshire Naturalists' Trust and the tenants of Read's Island.

Later that year, Ralph Chislett called a meeting in June at which some of our members were present, including Wilfred Taylor, Alfred Hazelwood, Bob Dickens, Henry Bunce and George Ainsworth to mention a few. The meeting was addressed by one of the local wildfowlers' leaders, Frank Mason, who explained the reasons and need for a refuge. This meeting may have been the result of Max Nicholson's prodding of the wildfowlers into getting in touch with Yorkshire naturalists for help towards their efforts. Informal as this meeting was, it was a crucial one as there was obvious sympathy for the idea, and Frank Mason and his colleagues, some of whom were also present, may well have been surprised at this. However, it was probably the straightforward, no-nonsense approach by Alfred Hazelwood which may have influenced Ralph Chislett and Wilfred Taylor into something like firm support for the idea.

Max Nicholson then called a further meeting for 1st October 1955 in Hull which he chaired, and at which he reviewed events which had taken place since the January meeting. These included a press notice issued on 29th July announcing the proposed establishment of an experimental Wildfowl Refuge on the Humber, the appointment of a warden and the preparation of the Home Office Order. The Nature Conservancy would provide and pay for the warden provided the Committee would agree on the warden's duties and the general administration of the Refuge, the warden being immediately responsible to the Secretary of the Committee. It was then agreed that the Committee should be called The Humber Wildfowl Refuge Committee and would consist of six each of wildfowlers and naturalists, drawn from local organisations, with the tenants of Read's Island, and representatives from W.A.G.B.I., the Humber Conservancy Board and the Nature Conservancy acting as observers. Later that afternoon the Committee held its first meeting under the Chairmanship of Trevor Field, a local businessman, J.P. and wildfowler. The Home Office Order, Statutory Instrument 1955 no. 1532 (Fig. 3), was also made on 1st October and came into force on 14th October 1955 under the title The Wild Birds (Humber Sanctuary) Order, 1955, being applicable between 1st September each year until 20th February the following year. Thus was born the first of what Max Nicholson had been after for a long time, the establishment of wildfowl refuges for quarry species.

The friendly relationship now established between the two apparently conflicting groups surprised many and I would like to quote Mr. Nicholson's words in a letter to me:

"I will find it a pleasure to meet your members again and recall the discomfiture of the press when we broke it to them that we had decided not to quarrel after all".

Much deserved praise has been heaped on Nicholson for his persuasive and diplomatic skills in many apparently hopeless situations. In supporting these sentiments I would like also to praise the individuals of both groups for their determination to sink differences and act in a common cause. One instance of their respect for one another is seen regarding the Chairmanship of the Committee: it had been agreed that the office should alternate each year between wildfowler and naturalist; however, the first Chairman, a wildfowler, was re-elected for another twenty-two years.

The Refuge itself (Fig. 2) consists in the main of about 1,300 hectares of sand and mud-flats, with its eastern boundary running along a line from Brough Haven on the north shore to Whitton Ness on the south, the western boundary being a line from Faxfleet Ness on the north shore, through the Apex light and on to the south shore below Alkborough. The boundaries along the northern and southern shores are somewhat complex and I will go into the difficulties of interpreting them later. The Refuge is part of what is now the Upper Humber Flats and Marshes S.S.S.I., first notified in 1957, and renotified in 1987; it extends from just west of the Humber Bridge to Blacktoft on the Ouse, and includes the whole of the Humber embankments and saltmarshes as well as an important site of fresh water at Faxfleet. The S.S.S.I. boundary on the south shore takes in the important sites of Alkborough Flats in the Trent and the R.S.P.B. reserve at Blacktoft Sand. Other features are the Ferriby Cliffs, the Broomfleet Island reedbeds and of course, Read's Island.

As I have already said, the main duty of the Refuge warden was the prevention of

S T A T U T O R Y I N S T R U M E N T S

1955 No. 1532**WILD BIRDS****The Wild Birds (Humber Sanctuary) Order 1955***Made - - - -**1st October, 1955**Coming into Operation**14th October, 1955*

In pursuance of the powers conferred on me by subsection (1) of section three of the Protection of Birds Act, 1954(a), I hereby make the following Order:—

1. The area (hereafter in this Order referred to as the "Humber sanctuary") specified in the Schedule to this Order shall be a bird sanctuary, and the following provisions of this Order shall have effect with respect thereto.

2. Any person who, within the Humber sanctuary, at any time wilfully kills, injures or takes, or attempts to kill, injure or take, any wild bird shall be guilty of an offence against the Act.

3.—(1) Subject as provided in paragraph (2) of this Article, any person who enters into the Humber sanctuary, in the period commencing on the first day of September in each year and ending on the twentieth day of February in the next following year, shall be guilty of an offence against the Act.

(2) Nothing in this Article shall apply as respects the entry into the Humber sanctuary—

(a) by boat of any person who does not leave the boat while within the said sanctuary;

(b) for the purposes of the functions under the River Boards Act, 1948(b), of any river board constituted under that Act, of any officer or servant of that Board; or

(c) of any person appointed in writing by the Nature Conservancy.

4. Where any person in the Humber sanctuary does any act which by virtue of Article 2 or 3 or this Order is an offence against the Act he shall be liable to a special penalty.

5.—(1) In this Order, the expression "the Act" means the Protection of Birds Act, 1954.

(2) The Interpretation Act, 1889(c), shall apply to the interpretation of this Order as it applies to the interpretation of an Act of Parliament.

6. This Order may be cited as the Wild Birds (Humber Sanctuary) Order, 1955, and shall come into operation on the fourteenth day of October, 1955.

G. Lloyd-George

One of Her Majesty's Principal
Secretaries of State

Home Office,

Whitehall.

1st October, 1955.

trespass on the Sanctuary, particularly since there is difficulty in interpreting the Refuge boundaries. The east and west ones presented no real problems, but the north and south ones, particularly the former, certainly did. The following part of the Schedule in the Statutory Instrument referring to these reads:

“the southern/northern line means a line parallel to and one hundred yards below the high water mark of ordinary tides or, in such areas as have shore vegetation growing across the said high water mark, parallel to and one hundred yards below the lower edge of such portions of shore vegetation as are connected without any break to the shore vegetation growing across the said high water mark as aforesaid . . .”

Now just imagine a wildfowler, birdwatcher or anyone else for that matter trying to decide whether he is trespassing on the Sanctuary or not. In other words, the black and white areas are quite simple to delineate, but not the grey ones! An arbitrary line was obviously desirable and eventually the Committee agreed that on the northern shore, where the vegetation tended to be both broken and continuous, the line of the north bank of Crabley Creek should be the boundary. There have been incidents of trespass, though not many, including the odd occasion when the local press had obviously been forewarned by the trespasser of his intended action. However, an incident occurred in 1963 which involved the frontage of Broomfleet Island, previously considered sacrosanct. This resulted in the incorporation of the frontage and embankment of Broomfleet Island, though a second Statutory Instrument, 1963, no. 1808 was necessary.

By the mid-1960s, the increased use of private transport and better road systems had led to an increase of visiting shooters from afar and a consequent “free for all” situation in which the irresponsible thrived. The Committee, with the co-operation of the Humber Conservancy Board, set about establishing a system of controlled shooting in which only permit holders were allowed to shoot on clearly designated fringes of the Refuge. The Committee was granted the lease of the foreshore shooting rights, the local landowners between Brough and Crabley Creek agreed to allow the Committee to restrict the right of access over their greenshore to armed wildfowlers and as a result of this scheme, which began in 1965, relative peace and order were restored. Members of the two local wildfowling clubs could apply for season permits while a small number of day permits were available to visiting shooters, who had to be members of W.A.G.B.I. All this, however, increased shooting pressure at Faxfleet and in 1969 a similar scheme was established there, with one important difference. At the specific request of those who lived almost on the river bank, shooting on Sundays was banned. Similar efforts to establish such a scheme on the south shore did not meet with success, although the Committee now held the shooting rights of almost the whole of the foreshore of the Refuge, the cost of these being met by the permit-holders themselves.

For about eight years the Pink-footed Geese responded very well indeed to all the effort and time which had gone into the provision of a safe roost. The autumn of 1957 was probably the height of Peter Scott’s ringing programme when he caught 250 Pink-feet on the Yorkshire Wolds on 22nd October. In two consecutive seasons, 1959-60 and 1960-61 the warden’s maximum counts were 20,000. These figures were probably an overestimate as other experienced observers put the numbers at between 10,000 and 15,000 (Fig. 4). What went wrong? A possible major factor was that the intensive cereal growing now the norm in England had reached Scotland, resulting in much increased feeding opportunities for the geese, whose migration pattern coincided with the later harvest in the north. The Refuge Committee’s attitude to these falling numbers was that it was better for the species to be scattered in small numbers in more localities than have large numbers in just a few, where sudden changes of any kind could have a serious effect. However, numbers appeared to stabilise for a few years, but in 1971 the autumn peak fell to 1,650, the lowest ever recorded. By now, spring sowing on the Wolds was giving way to autumn sowing, with the subsequent cereal harvest being completed, stubbles burned off and autumn sowing being in progress even before the arrival of the geese.

The usual pattern of the Pink-foot in winter was to forage on the stubbles of the Yorkshire and Lincolnshire Wolds until late November or thereabouts, then move down to the Wash region of Lincolnshire to glean the potato fields. In the early weeks of the new year the birds would return, in much smaller numbers, presumably preparing for the return migration via the Solway. Now, the numbers returning at this time were, by the end of the

PINK-FOOTED GOOSE (*Anser brachyrhynchus*)

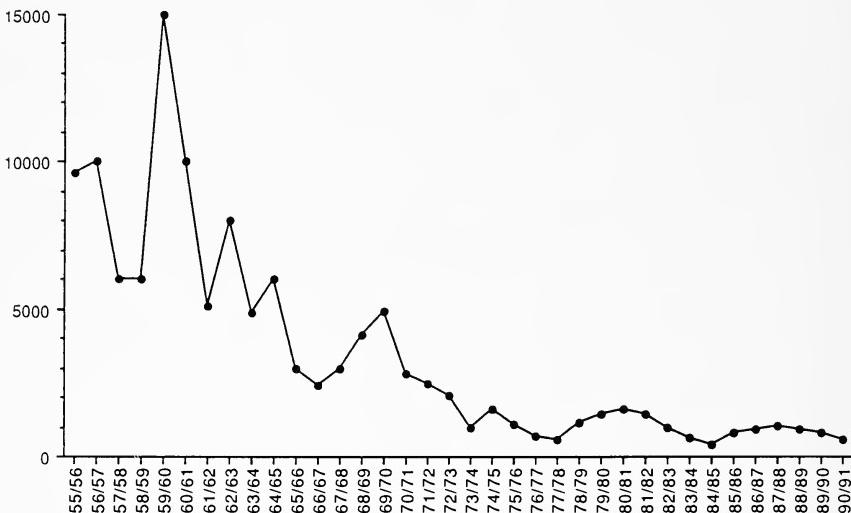


FIGURE 4
Annual maximum counts 1955/56 to 1990/91

1970s, higher than the previous autumn's peaks, so low had the autumn figures become.

In January 1975 tragedy struck. The autumn of 1974 had been excessively wet. Farming operations were delayed, including not only harvesting but the subsequent ploughing and sowing of next year's winter corn. There was a partial drying-out period in the second half of December and it was towards the end of this period that a sudden influx of birds occurred, bringing numbers up to 1,300. On 5th January 1975 it was obvious that the birds had found a feeding area to the south of the Refuge. The following morning, a local wildfowler found several dead and dying geese on the Alkborough Flats shore at the same time as were some on the Faxfleet shore. The birds had found a field of recently sown dressed autumn wheat which had been drop-sown by a farmer desperate to make good the autumn delay. Unfortunately this had resulted in a massive poisoning. The whole sorry business is covered in *The Naturalist* (Pashby 1976). It was estimated that 500 geese had perished and the following autumn saw the first three-figure maximum. A slight increase followed, but overall the decline continued, with a maximum of 382 during the 1984-85 season; in fact, the 560 of last season occurred not on the Refuge itself but further east in the Read's Island area. Meanwhile, in Lancashire numbers increased annually to vast peaks of 20,000-30,000. The end of an era? Who knows? It may all happen again.

The difficulties of quantifying total waterfowl populations on the Humber are immense and the relatively small area of the Refuge is no exception to this. Way back in 1955 it was agreed that the primary purpose of the Refuge was the conservation of stocks of Pink-footed Geese and that it could be assumed that adequate measures for this purpose would

incidentally provide any necessary additional protection for other species. Nevertheless, instructions to the warden in those days were to monitor and count the Pink-feet and to do the same for other species if and when his time allowed, and for many years this remained so. I think it can be taken that the Pink-feet counts throughout the whole period since 1955 were on the whole complete and accurate; being large birds they were fairly easy to count when airborne.

For the other species, however, it has never been anything like so simple. Most of the wardens' counts were done from the north shore of the Refuge and were, in the main, restricted to that part of Whitton Sand they could see. There was no Humber Bridge until 1981, and visits to the south shore were very limited, most being of a business nature and not concerned with counting wildfowl. Counts were made in all weathers, with the counter sometimes exposed to the worst of the elements. When the observation hide was built in 1974, this vastly improved the working conditions, but counting still went on from a fixed point on the north shore, the only exceptions being on those days when the British Trust for Ornithology's Birds of Estuaries Enquiry counts were taking place.

In spite of these limitations there are maximum counts for all seasons (September-March) since 1971, plus figures for Shelduck from 1956. It is important to emphasise that direct comparison between the early periods and the later is not always possible. Nevertheless, the figures do show some general increase or decrease over the twenty year period.

Before dealing with the main duck and wader species which are present on the Refuge, I would like to diverge a little to a term which one may well have come across when reading about wetlands conservation. I refer to the "Ramsar Convention". There is a world-wide body known as the International Waterfowl Research Bureau. It met in 1971 at Ramsar, Iran, and agreed on the text of a Convention on Wetlands of International Importance Especially on Waterfowl Habitat, thereafter known as the "Ramsar Convention". By April 1990, 52 countries were parties to the Convention and 30 million hectares of wetland had been designated under it, comprising 445 sites. In Britain, the total area of Ramsar sites was 130,000 hectares; across the water in Denmark there were two million hectares. The criterion used in evaluating a wildfowl site was that it should hold 1% of the north-west European population of a species. At a further conference of the I.W.R.B. at Heiligenhafen, Germany in 1974, additional criteria were added for site classification which were then re-examined at another conference at Cagliari, Italy in 1980. Briefly, they are as follows: a wetland should be considered internationally important if it A. regularly supports either 10,000 ducks, geese and swans; or 10,000 Coots; or 20,000 waders; or B. regularly supports 1% of the individuals of the population of one species or sub-species of waterfowl; or C. 1% of breeding pairs.

So, on to the fortunes of six species of ducks and three of waders. Figures 5 to 13 show the average of peak counts over five-year periods; National Importance levels are shown by a broken line and International or "Ramsar Convention" ones with alternate "dot-dash".

SHELDUCK (*Tadorna tadorna*)

A local breeder, the Shelduck is also a passage-migrant and winter visitor (Plate 1). Numbers on the Upper Humber remained fairly stable but showed a small increase in the 1970s (Fig. 5), and a further increase in the early 1980s with a remarkable one in the following years. This can probably be explained by there being a sufficiently adequate food supply, though there may well be another contributory factor. The majority of the north-west European population fly to Heligoland Bight for their moult. The first recorded exception to this in Britain was the establishment of a moulting flock in Bridgwater Bay in the early 1950s, to be followed by others in the Forth in 1976, the Dee in 1983 and the Wash, also in the early 1980s. The Humber was no exception to this extension of the bird's moulting range, as in 1978, Mark Tasker found a moulting party in the lower estuary and about five years ago Derek Cutts confirmed his earlier suspicions that birds were now forming a moulting flock on the Refuge. It is probably this that has also caused the increase

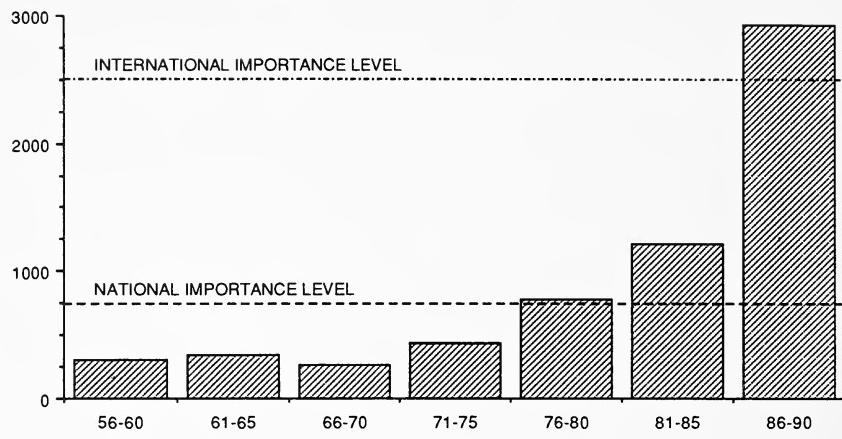
SHELDUCK (*Tadorna tadorna*)**Maximum count = 4,186 (Oct. 1988)**

FIGURE 5
5-year averages of annual maximum counts 1956 to 1990.

in numbers to such an extent that the Shelduck can now be regarded as one of the most numerically important species on the Refuge. The highest number recorded was 4,186 in October 1988, of which just over half were on the Refuge, the remainder being in the Read's Island and Pudding Pie areas. The average peak-count of the five years 1986-90 was above the level of International Importance.

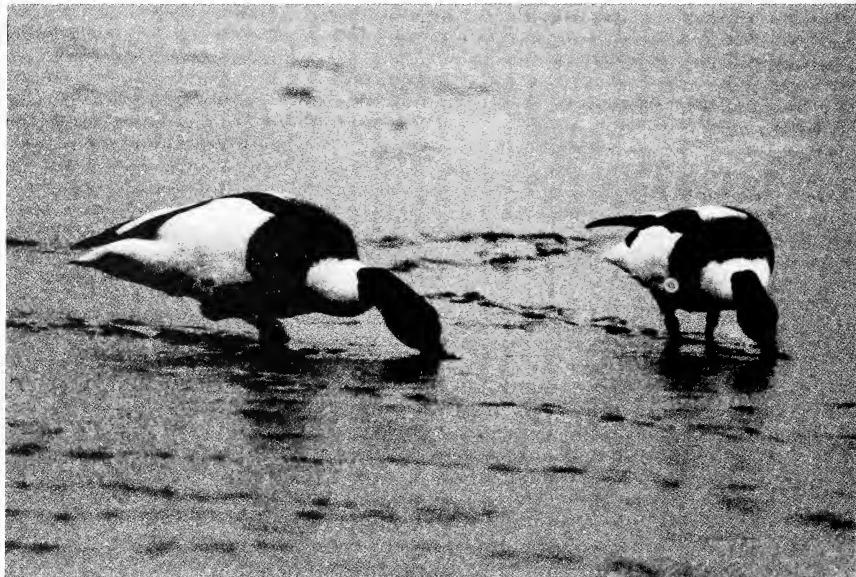


PLATE 1. A pair of Shelduck feeding on the Humber mud. Photo: Richard Vaughan.

WIGEON (*Anas penelope*)

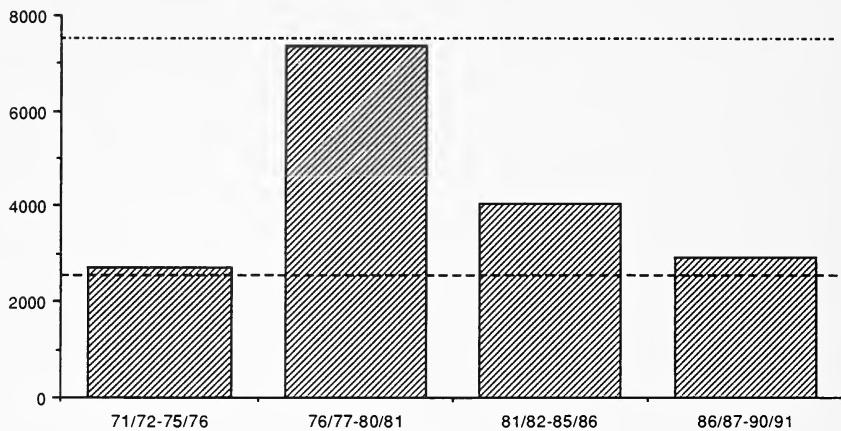
Once regarded as Britain's most numerous wintering duck, it still occurs in large numbers, a feature being its distribution over relatively few sites but in large numbers at each, most of them being reserves of one kind or another. It is a grazing species (Plate 2), coastal feeders preferring the fine grasses such as *Puccinellia maritima* and *Festuca rubra*, both of which are present on the Broomfleet salting, but this has not always been so. The Wigeon habitat only became established after the introduction of sheep on the salting in the mid-1960s. This resulted in the rapid decline of the then dominant plant *Aster tripolium*, the Sea Aster, and although there had been an appreciable amount of *Puccinellia* prior to this, sheep grazing caused it to flourish and large areas of hitherto bare mud soon became colonised by this grass. Subsequently an interesting sheep/Wigeon relationship became apparent. The Wigeon preferred the already cropped grass, ignoring any coarser plants left by the sheep. In other words, sheep grazing is also an essential for the optimum feeding opportunities for Wigeon. However, things are never as simple as they seem. Severe weather means an influx of more birds, possibly from the Continent, possibly from as near



PLATE 2. Part of the Refuge Wigeon flock busily grazing on the saltings.

Photo: Richard Vaughan

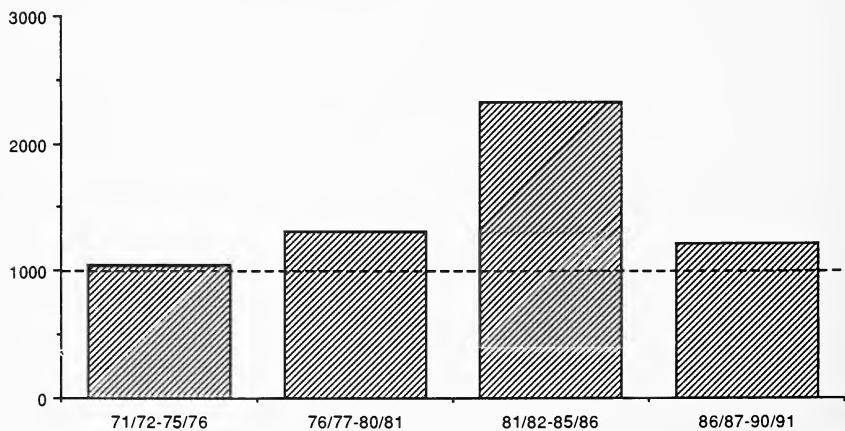
as the Lower Derwent Valley National Nature Reserve. When this occurs there is a rapid decline in the available food supply which disappears, forcing the ducks to find alternative food elsewhere. This situation occurred at least three times in the late 1970s and early 1980s (Fig. 6), the peak numbers of duck approaching International Importance levels. If these influxes take place in December-January, the food supply may run out; if they are later in the season, it may just suffice. On the whole, the recent milder winters have resulted in peaks normally considered commensurate with the available food supply. To sum up, a healthy situation exists, with two reserves in the county, apparently complementary to one another, providing undisturbed safe feeding and roosting areas.

WIGEON (*Anas penelope*)**Maximum count = 9,600 (Jan. 1980)****FIGURE 6**

5-year averages of annual maximum counts 1971/72 to 1990/91.

TEAL (*Anas crecca*)

Essentially an autumn passage-migrant, peak counts are between September and November with 3,500 in September 1955 being the maximum and, closer to the present day, 3,200 in mid-October 1982. Up to the 1972-73 season, peaks were usually no more than 750, but a sudden increase to 1,300 in 1973-74 was followed by four-figure peaks in all but four seasons up to last year (1990) with an average peak of 2,300 for the five years 1981-82 to 1985-86 (Fig. 7). The increase of the Whitton Sand has produced a habitat ideally suited to the Teal. It has always achieved National Importance levels of 1,000 and has obviously found the conditions and relative security of the Refuge to its liking.

TEAL (*Anas crecca*)**Maximum count = 3,200 (Oct. 1982)****FIGURE 7**

5-year averages of annual maximum counts 1971/72 to 1990/91.

MALLARD (*Anas platyrhynchos*)

The Humber has for many years been at or near the top of the National table for numbers of wintering Mallard, with the Refuge being its most important site. For some time now, it has been suggested that the wintering flock roosting on the Refuge may be composed largely of native breeding stock. The Birds of Estuaries Enquiry shows that the mid-winter numbers in the Lower Humber are more or less maintained while those in the Upper Humber fall dramatically in February and March, the birds presumably moving to local breeding areas. The Lower Humber birds remain until they depart for their breeding areas on the Continent some time later. If this is so, then the drop in peak numbers at the Refuge during the last ten years is a little worrying (Fig. 8). In fact, last winter showed the lowest peak for thirty years and it could well be that the species has had a succession of poor breeding seasons. The highest figure recorded was 8,140 in January 1981, December 1990 peak being only 1,270. Let us hope that the fortunes of this well known but very beautiful duck take a turn for the better.

Now to two species of ducks at the bottom of the numbers scale, but interesting nevertheless.

MALLARD (*Anas platyrhynchos*)

Maximum count = 8,140 (Jan. 1981)

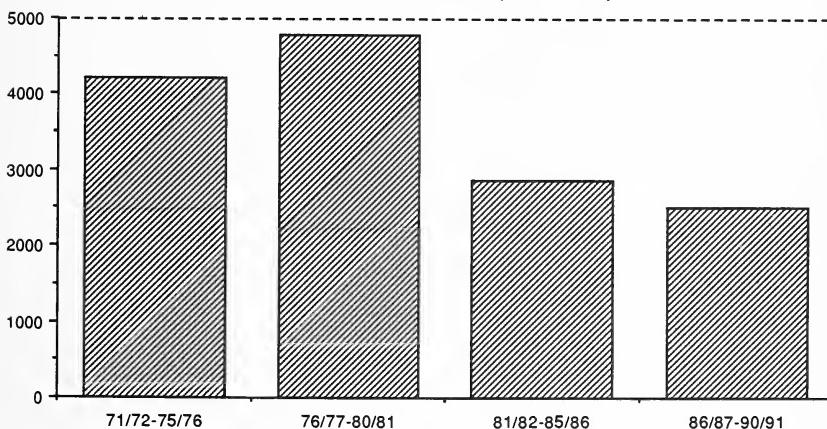


FIGURE 8
5-year averages of annual maximum counts 1971/72 to 1990/91.

PINTAIL (*Anas acuta*)

Here the gradual increase, especially in the most recent years (Fig. 9), of a species, which like the Teal is mainly a passage-migrant, is very welcome. In the early days the peaks were in single figures only but there was a maximum of 400 in October 1990. (There was a further increase to a maximum of 1,375 in November 1991, almost certainly the highest number ever recorded in Yorkshire.)

GOOSANDER (*Mergus merganser*)

This attractive fish-eating duck was once very scarce, but in recent years has gradually increased from low single figures to something like c.30 for its average peak numbers (Fig. 10). These are usually in January or February with a maximum of 73 in February 1991. The Goosander is a very welcome newcomer to the Refuge.

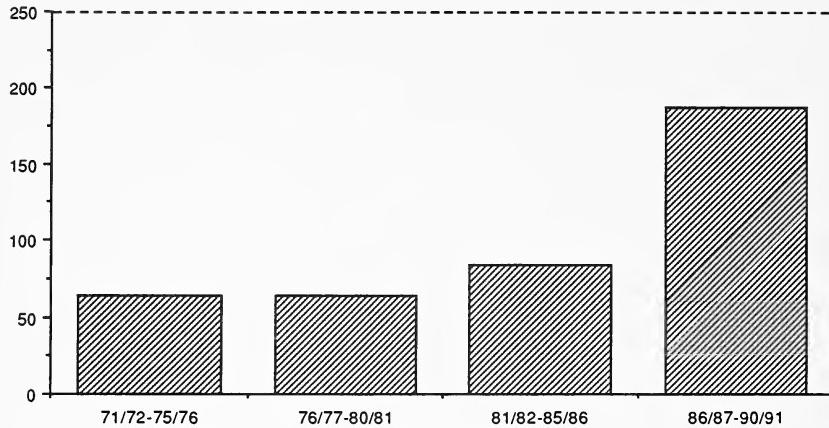
PINTAIL (*Anas acuta*)**Maximum count = 400 (Oct. 1990)**

FIGURE 9
5-year averages of annual maximum counts 1971/72 to 1990/91.

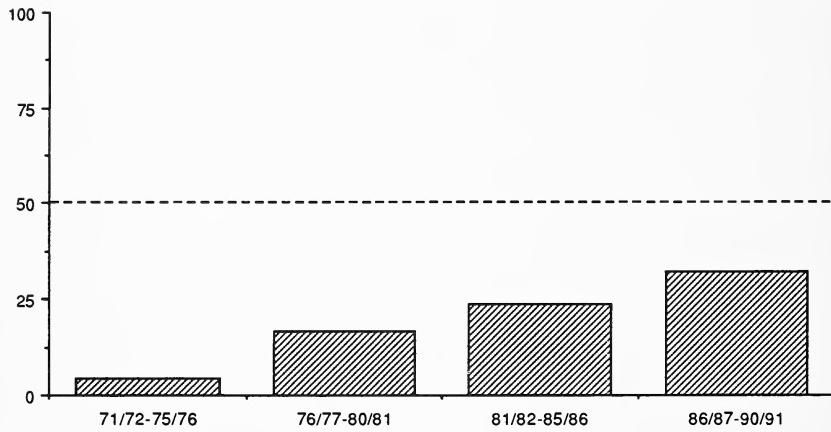
GOOSANDER (*Mergus merganser*)**Maximum count = 73 (Feb. 1991)**

FIGURE 10
5-year averages of annual maximum counts 1971/72 to 1990/91.

GOLDEN PLOVER (*Pluvialis apricaria*)

This bird primarily uses the Refuge as a safe roost, feeding to a much lesser extent and flighting to main feeding areas around the Refuge. As can be seen from the average peaks of the early 1970s (Fig. 11), it did not occur in exceptional numbers. The dramatic, but steady increase to maximum counts of 8,000 on 8th December 1979, which was then the

largest flock ever recorded in VC61, 14,000 in December 1988 and 15,000 in the same month a year later, may well reflect the growth of Whitton Sand and the consequent increase in its roosting potential.

GOLDEN PLOVER (*Pluvialis apricaria*)

Maximum count = 15,000 (Dec. 1988)

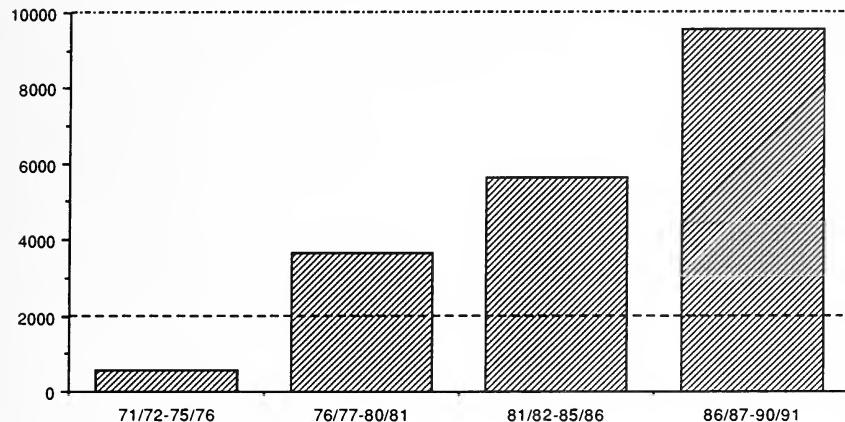


FIGURE 11

5-year averages of annual maximum counts 1971/72 to 1990/91.

LAPWING (*Vanellus vanellus*)

The Lapwing has always been a bird of the Refuge, but its peak numbers up to the late 1970s were usually the result of severe weather. As with the previous species, an upward

LAPWING (*Vanellus vanellus*)

Maximum count = 18,000 (Jan. 1989)

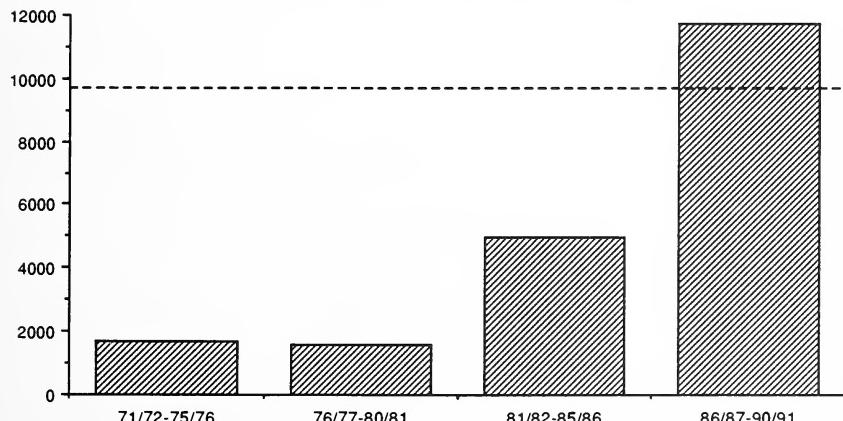


FIGURE 12

5-year averages of annual maximum counts 1971/72 to 1990/91.

surge coincided with the increase and stabilisation of Whitton Sand, (Fig. 12). Peak counts were 13,400 in December 1987 and 18,000 in January 1989.

DUNLIN (*Calidris alpina*)

The earlier figures possibly represent an undercount and the population level over the years has been relatively stable, although numbers do appear to be increasing in recent years as indicated on the histogram (Fig. 13).

DUNLIN (*Calidris alpina*)

Maximum count = 6,030 (Feb. 1989)

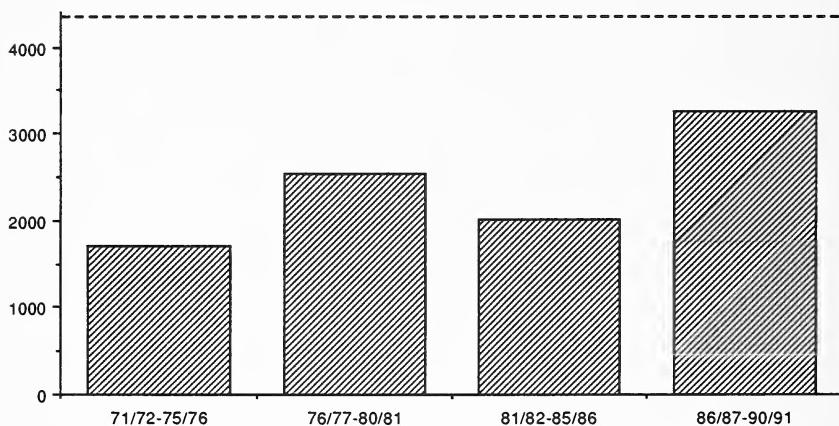


FIGURE 13
5-year averages of annual maximum counts 1971/72 to 1990/91

The totals (absolute numbers) of the average annual maximum counts 1985-1989, of four species of ducks (Fig. 14) and three species of waders (Fig. 15) alone, show that the Upper Humber qualifies as an area of International Importance.

	Average annual Maximum	National	International (Ramsar)
Shelduck	2909	750	2500
Wigeon	3100	2500	7500
Teal	1410	1000	4000
Mallard	2840	5000	50000
Absolute	10259		10000

FIGURE 14
Average annual maximum counts of four species of duck 1985-1989 with qualifying levels for national and international importance.

	Average annual Maximum	National	International (Ramsar)
Golden Plover	8600	2000	10000
Lapwing	9130	10000	20000
Dunlin	2820	4300	14000
Absolute	20550		20000

FIGURE 15

Average annual maximum counts of three species of wader 1985-1989 with qualifying levels for national and international importance.

In conclusion, Derek Cutts, current Chairman of the Refuge Committee, writes:

"I think you will agree that through the hard work of a group of people, the last 36 years have been years of success and it is encouraging to know that the undoubtedly importance of the Wildfowl Refuge and the wider Upper Humber S.S.S.I., has been recognised by an application from English Nature for designation as a Wetland of International Importance under the "Ramsar Convention", and also as a Specially Protected Area under E.C. Directive. We hope these designations will be forthcoming in the near future."

I believe it has been clearly demonstrated that for the majority of species the Refuge is a success, with many species showing substantial increases in numbers. The one obvious exception to this picture is ironically the Pink-footed Goose. We have seen the relatively low numbers over the last 15 years or so which may well be due to the limited availability of local feeding due to the previously discussed changes in agricultural practice. After all, very substantial numbers of Pinkfeet still winter as far south as the Refuge. Lancashire has wintering flocks of 20,000 or 30,000 and presumably there is adequate food available.

So, what of the future? The varied work of the Refuge Committee will continue, and a worthwhile initiative may be to examine, in partnership with English Nature, the feasibility of increasing the amount of local food available to the Pinkfeet, possibly by means of something like the establishment of Sensitive Land Management Agreements."

ACKNOWLEDGEMENTS

I am grateful for the help received from many people, and whilst it is not possible to mention them all by name, I do wish to thank the following: Ted Smith of the Lincolnshire Naturalists' Trust, Frank Mason of the Hull and East Riding Wildfowlers' Association and first Secretary of the Refuge Committee, Henry Bunce, Derek Cutts, John Turner, and John White; John Cudworth for the maps, Paul McSherry for the graph and histograms, Richard Vaughan for the photographs, also Helen Stace of English Nature, Captain D. Thomas, Harbour Master, Humber and D. Lusby, Assistant Hydrographer, both of Associated British Ports; and lastly my wife Shirley, for her unfailing help and encouragement.

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BOOK REVIEWS

The Ant and the Peacock by Helena Cronin, with foreword by John Maynard Smith. Pp. xiv + 490, including black and white photographs, and line illustrations. Cambridge University Press. 1991. £27.50 hardback.

The Ant and the Peacock comprises sixteen chapters, an epilogue, a note on the letters of Darwin and Wallace, a comprehensive bibliography and an index. Controversies between early evolutionists are traced and illuminated by Helena Cronin in this scholarly and lucid book. Altruism and sexual selection no longer present the puzzles that they did in the mid-nineteenth century when the founding fathers of evolutionary theory regarded them as obstacles to the straightforward application of natural selection. Why should some individuals forego their ability to leave offspring, and work for the "benefit" of a community? Why should males of some species be handicapped by gigantic ornaments which waste their substance, and make them more conspicuous to predators? The seminal ideas of kin selection, costs and benefits, and the selfish gene are those of the second half of the following century; it is therefore unsurprising that to the burdens of irrelevant religious controversy (well documented elsewhere) borne by the early evolutionists were added those of highly relevant internal controversies when the seekers of scientific truth were themselves perplexed.

I seldom endorse the glowing opinions of the writers of publishers' blurbs on the dust jackets of books. In this instance I make an exception – science, history and philosophy, all are blended here to produce a gripping account of the evolution of evolutionary theory itself. This book I strongly recommend to *anyone* with the remotest interest in this, the unifying theory of life.

DJH

The Whales of Hawaii by Stanley M. Minasian, Kenneth C. Balcomb and Larry Foster. Pp. x + 99, with full colour illustrations. University of Hawaii Press for the Marine Mammal Fund. 1991. £4.95.

These fascinating animals are splendidly portrayed in this delightful booklet, full of superb underwater and surface photographs. This small volume encompasses a very considerable amount of information within its text which will be of interest to a wider audience than the title implies. In all, 22 species of Cetacea (and one seal!), many with extensive distributions, have so far been sighted in Hawaiian waters; a further four species are included that could well make their way to these exotic islands, depredations of man permitting. Aloha!

IJH

BATS AND THEIR ROOSTS IN CLEVELAND AND NORTH EAST YORKSHIRE

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INTRODUCTION

The aim of this paper is to present recent findings about the status and distribution of bats and their roost sites in Cleveland county and adjacent parts of North Yorkshire.

Distribution maps for bat species in this area (eg Howes 1983, Howes & Thompson 1985) convey valuable but basic information since each record could for example represent anything from an isolated, displaced individual to a large colony at a regularly occupied summer roost or hibernaculum. The passing of the 1981 Wildlife and Countryside Act afforded bats extensive legal protection, so highlighting their general decline and stimulating interest in these animals. Of note has been the establishment of a network of county bat groups, one such being the Cleveland Bat Group. It is perhaps worth pointing out that these organisations have come into being in a somewhat *ad hoc* manner and are largely based on the present county boundaries rather than on the Watsonian vice-county system adopted in much biological recording. Hence Cleveland Bat Group covers both the County of Cleveland and nearby parts of North Yorkshire, bounded approximately by lines joining Darlington, Osmotherley, Bilnsdale and Whitby, an area which thus includes parts of vice-counties 62 (north east Yorkshire), 66 (Durham) and a little of vice-county 65 (north west Yorkshire, the Middleton Tyas area).

The principal aim of this study has been to locate, survey and monitor bat roosting sites, in the hope of fostering their conservation. In practice, the majority of sites which have been located are summer roosts in buildings, where large concentrations of bats often occur. Initially these groups are composed of females only (or very largely so, depending upon the species), the majority of which are probably pregnant at the time of establishment of the colony each year. Birth usually occurs in the second half of June or early July and in any one colony most offspring are probably born within a week of one another (Tuttle & Stevenson 1982). How this synchrony is brought about seems to be unknown. Most females give birth to a single young, although twins have been recorded in some species (Stebbing 1991). The young are weaned and fully independent by the time the colony disperses in late summer. Individual female bats display a high degree of site fidelity over successive summers (Thompson 1987).

Much less is known about the location of adult males in summer, when most seem to roost singly or in small groups and are therefore easily overlooked. During winter, hibernating bats generally occur in moist and cool but frost free situations such as tree cavities, caves, disused mineshafts and similar places, the type of site depending upon species to some extent. Such sites are relatively inaccessible compared with summer roosts and this, coupled with the inactivity of the animals, means that they are much more difficult to locate in winter. For further information on British bats see Richardson (1985), Stebbings (1986), Schober and Grimmberger (1989), Ransome (1990), Wardhaugh (1990), and Corbet and Harris (1991).

METHOD

Information on roost sites was collected from 1983 to 1991 inclusive. Typically, summer roosts were visited at dusk when bats emerge to feed. The number of bats leaving was recorded and sometimes one or a few individuals were caught by hand net to confirm identification. The latter activity was carried out under licence from the Nature Conservancy Council for England as required by the 1981 Wildlife and Countryside Act. Other data regarding the nature of the roost site were recorded as appropriate.

RESULTS

A total of 92 roost sites was located in the study area. Of these, at 34 sites the species was not, or has not yet been confirmed by hand netting emerging individuals. All data presented here deal with the remaining 58 sites, where five species were encountered, the pipistrelle (*Pipistrellus pipistrellus*), the brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*), Brandt's bat (*Myotis brandtii*) and Natterer's bat (*Myotis nattereri*). Distribution maps are presented in Figures 1, 2 and 3. Data concerning all known sites and those known to serve as summer nursery roosts are summarised in Tables 1 and 2 respectively. These data indicate that the large majority of known sites are nursery roosts and that the pipistrelle is by far the most common species. For pipistrelle nursery roosts, the building types and precise sites occupied are indicated in Tables 3 and 4. The direction faced was also noted (Figure 4). Systematic and detailed study of one or more roost sites was beyond the scope of this study but nevertheless a significant amount of information about period of occupation and numbers of animals present was collected. Table 5 provides information on occupancy in terms of the number of instances on which pipistrelles were found to be present at roost sites during half-monthly periods (ie. if bats were present at a site on a particular date then this is included as one count in the appropriate column of the table). Bats were not necessarily present for the whole of this half-monthly period; they may or could have been present for as little as one day. (Where bats were known to have been present for more than one day in a half-monthly period this of course is still recorded as one count). It was often possible to count the number of bats emerging from the nursery roost at dusk and this information is summarised in a similar way in Table 6. In some instances, individual roost sites were visited on a number of occasions during one or more summers and data relating to the highest counts made at each nursery site visited in any one year are presented in Table 7.

For many pipistrelle nursery roosts, it was possible to determine the age of the building and from this information a mean age of 37.2 ± 46.4 years ($N = 86$) has been calculated. In this calculation one unit of data (N) is the age, in years, of the building occupied during the summer concerned. Where bats were present at a site of known age for more than one summer then the appropriate age was included in the calculation for the corresponding number of summers. Data from 22 nursery roosts were used to derive this mean. One site

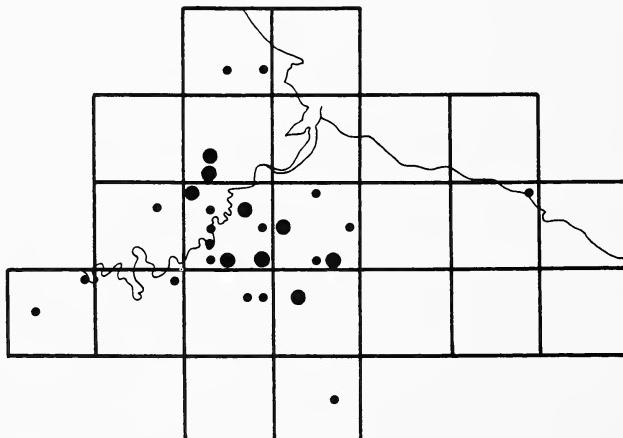


FIGURE 1
Tetrad distribution of known roost sites of the pipistrelle in
Cleveland and north-east Yorkshire.
● = one roost ● = two to five roosts

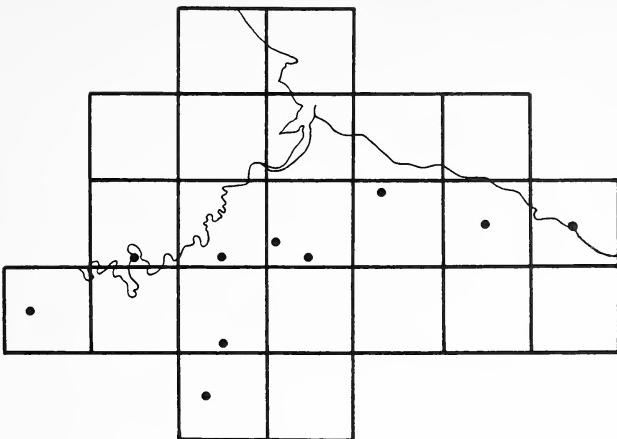


FIGURE 2

Tetrad distribution of known roost sites of the brown long-eared bat in Cleveland and north-east Yorkshire.

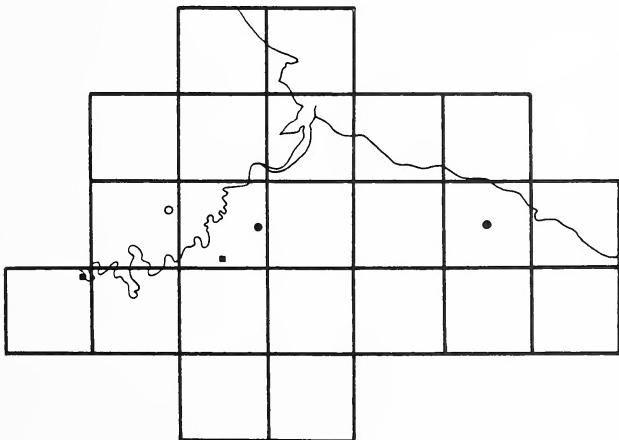


FIGURE 3

Tetrad distribution of known roost sites of Brandt's, Daubenton's and Natterer's bats in Cleveland and north-east Yorkshire.

● = Brandt's bat ■ = Daubenton's bat ○ = Natterer's bat

was a notable exception in age, being a house built in 1851; all other buildings were much newer. If this site is excluded (where bats were present every summer from at least 1976 until 1991) then the mean age of occupied buildings is 15.4 ± 8.0 years ($N = 70$. Range = 4 to 41 years).

Comparison of Tables 1 and 2 reveals that for the pipistrelle five sites which are not nursery roosts were located. One site is a known hibernaculum in a west facing porch over the door of a semi-detached house built about 1950. One or a few individuals have been

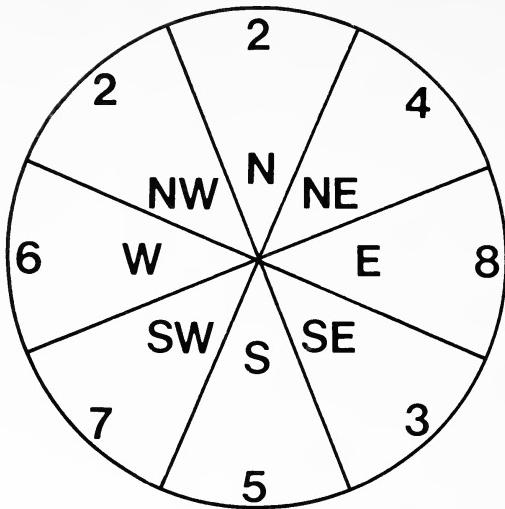


FIGURE 4
Pipistrelle nursery roosts: distribution of aspects faced ($n = 37$)

TABLE 1
Numbers of known roost sites (all types)

Species	Cleveland (%)	North Yorkshire (%)	Total (%)*
Pipistrelle	28 (82.4)	15 (62.5)	43 (74.1)
Brown long-eared bat	3 (8.8)	7 (29.2)	10 (17.2)
Daubenton's bat	1 (2.9)	1 (4.2)	2 (3.4)
Brandt's bat	1 (2.9)	1 (4.2)	2 (3.4)
Natterer's bat	1 (2.9)	0 (0)	1 (1.7)
Totals	34	24	58

* For the pipistrelle (43), brown long-eared bat (10), and the three *Myotis* species amalgamated (5), deviation from an equal frequency of occurrence is highly significant: chi squared = 110.74, P < 0.001.

observed here intermittently during winter, most years since 1985-6. The animals occupy a downward facing gap between the exterior wall of the house and the adjoining lead covered wooden roof of the porch. Another site is a large, three-storey house built in 1881 where a torpid pipistrelle was found between the folds of a curtain in a little used bedroom on 15th February 1986. At the same time at least three bats were seen flying inside the building. The remaining three sites are used during summer at least and seem to be occupied exclusively by small numbers of male pipistrelles, although further study is needed to confirm this. Of thee, two are church interiors. It is interesting to note that during an extensive survey of pipistrelle roosts on the Vale of York, no large hibernacula with several bats present were found (Thompson 1990).

The second most frequently encountered species in this survey was the brown long-eared

TABLE 2
Numbers of known roost sites (nursery)

Species	Cleveland (%)	North Yorkshire (%)	Total (%)*
Pipistrelle	25 (80.6)	13 (81.3)	38 (80.9)
Brown long-eared bat	3 (9.7)	2 (12.5)	5 (10.6)
Daubenton's bat	1 (3.2)	1 (6.3)	2 (4.3)
Brandt's bat	1 (3.2)	0 (0)	1 (2.1)
Natterer's bat	1 (3.2)	0 (0)	1 (2.1)
Totals	31	16	47

* For the pipistrelle (38), brown long-eared bat (5), and the three *Myotis* species amalgamated (4), deviation from an equal frequency of occurrence is highly significant: chi squared = 109.85, P < 0.001.

TABLE 3
Pipistrelle nursery roosts: buildings occupied

Building Type	Cleveland (%)	North Yorkshire (%)	Total (%)*
Two storey house	20 (80)	5 (38.5)	25 (65.8)
Other two storey building	1 (4)	3 (23.1)	4 (10.6)
Bungalow	4 (16)	2 (15.4)	6 (15.8)
Church	0 (0)	2 (15.4)	2 (5.3)
Garden shed	0 (0)	1 (7.7)	1 (2.6)
Totals	25	13	38

* Deviation from equal frequency is highly significant: chi squared = 20.88, P < 0.001.

TABLE 4
Pipistrelle nursery roosts: sites occupied

Site	Cleveland (%)	North Yorkshire (%)	Total (%)*
Soffit	13 (52)	5 (38.5)	18 (47.4)
Facia	4 (16)	2 (15.4)	6 (15.8)
Hanging tiles	4 (16)	0 (0)	4 (10.5)
Wall cavity	2 (8)	2 (15.4)	4 (10.5)
Cladding	0 (0)	4 (30.8)	4 (10.5)
Flat roof void	2 (8)	0 (0)	2 (5.3)
Totals	25	13	38

* Deviation from equal frequency is highly significant: chi squared = 26.53, P < 0.001.

TABLE 5
Pipistrelle nursery roosts: period of occupancy

Apr 16-30	May 1-15	May 16-31	Jun 1-15	Jun 16-30	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sept 1-15	Sept 16-30
2	5	9	9	13	20	13	12	3	2	2

Data based on observation of 31 roost sites. Deviation from equal frequency is highly significant: chi squared = 42.6, P < 0.001.

TABLE 6
Pipistrelle nursery roosts: numbers of animals recorded

	May 1-15	May 16-31	Jun 1-15	Jun 16-30	Jul 1-15	Jul 16-31	Aug 1-15	Aug 16-31	Sept 1-15	Sept 16-30
Σ	266	706	320	736	1431	844	587	123	—	8
n	6	6	9	9	15	14	13	3	—	2
\bar{x}^*	44.3	117.7	35.6	81.8	95.4	60.3	45.2	41	—	4
$\bar{o}n^1$	23.1	150.0	43.8	46.7	71.1	51.0	30.7	26.9	—	2.8

Data based on observation of 27 roost sites.

*Deviation from equal frequency is highly significant: chi squared = 152.58, P < 0.001.

TABLE 7
Pipistrelle nursery roosts: maximum annual counts

	1983	1984	1985	1986	1987	1988	1989	1990	1991
Σ	439	646	328	391	300	429	411	914	237
n	4	6	4	8	5	5	2	7	7
\bar{x}^*	109.75	107.7	82.0	48.8	60.0	85.8	205.5	130.6	39.9
$\bar{o}n^1$	35.8	42.3	76.9	30.7	28.0	38.4	135.1	131.1	15.9

Data based on observation of 24 roost sites.

TABLE 8
Brown long-eared bat roost sites

Site type	Number of sites	Number of animals	Period of occupancy
Loft void, sandstone or brick house or similar	7	Up to about 30	Probably summer only (nursery)
Church tower interior sandstone wall cavity	1	Up to 32	Summer at least (nursery)
Church interior behind timbers	1	1	Summer at least
Disused railway tunnel	1	1	Winter (hibernation)

TABLE 9
Myotis species roost sites

Species	Site type	Roost position	Further remarks
Daubenton's bat	Stone road bridge over river	Cavity on underside of arch	Numbers difficult to estimate: about 20 to 30 bats. Nursery roost. 1988-91.
Daubenton's bat	Stone road bridge over river	Cavity on underside of arch	Numbers very difficult to estimate: about 50 in summer (1985-91). A few bats recorded at times in winter.
Brandt's bat	Sandstone church	Between slates and wooden underboard	Nursery roost occupied most years. Up to 16 bats. 1985-91.
Brandt's bat	Sandstone bungalow	Wall crevice in loft void	Two bats (one male) on 18.6.88. Void also a brown long-eared bat nursery roost.
Natterer's bat	Sandstone church	Behind timbers in nave	Up to 21 bats. Nursery roost occupied every summer 1983-91 but a longer history likely.

bat. Details for all known roost sites are provided in Table 8. Summary information about *Myotis* species is presented in Table 9.

DISCUSSION

Before attempting to draw specific conclusions from the data presented, it is essential that some general comments be made about the nature of roost sites, their duration of occupancy and inherent difficulties in determining the number of bats present. At the outset it is important to define the term 'colony'. Stebbings (1986) states that a colony of bats is a group of animals of one species in an area, which normally relate to each other exclusively.

Regarding nursery roosts, in general colonies of bats use more than one roost site. This is especially true of the pipistrelle, which may change roost site at any time during the summer. Thus nursery roosts can be occupied for any period between approximately May and September inclusive, continuously, for much of this time or for as little as a single day. An average period of occupancy of 12 days has been calculated for the Northamptonshire area (Richardson 1985). Bats often display a high level of roost site fidelity but nevertheless a site may be occupied for many successive summers, for a single year or sporadically, with bats present some years and absent others. Furthermore, in dwelling houses bats may occupy a site for a single summer and the property owners might then exercise their right under the Wildlife and Countryside Act to apply to the Nature Conservancy Council for England for permission to seal up the access point after the animals have left.

Direct counts of most British bat species within summer roosts is not possible because the animals usually occupy confined and inaccessible spaces as is indicated in the results of this survey. The best that can be done is to count the animals as they leave the roost to fly and feed at dusk. In general, all individuals emerge within about a half hour period. Not all bats leave the roost site every night but it is probable that the large majority do so on a fine

night. Hence it should be stressed that counts provide only an estimate of the number of animals present. A count at a nursery roost carried out in June would include only adult bats (the large majority being pregnant females), whereas a count in August is likely to include adults and their newly independent offspring. Not all females arrive at a nursery roost on the same date, although in general they will do so within a few days of one another. Similarly not all leave together at the end of summer, adults tending to disperse before juveniles (Stebbins 1968). Occasionally a colony will split up during summer and members then occupy two or more roost sites simultaneously (eg Thompson 1990).

The above points must be borne in mind when attempting to draw conclusions from numerical data.

Reference to Tables 1 and 2 and Figures 1, 2 and 3 indicate that in the study area the pipistrelle is by far the most abundant and widespread species, with the brown long-eared bat the next most numerous, a pattern which is in line with findings in Britain generally (Stebbins & Griffith 1986). The maps (Figures 1, 2 and 3), notably that for pipistrelle roosts, represent a considerable extension of previously published information for this area (Howes 1983, Howes & Thompson 1985, Thompson 1990, the limitations of which are pointed out in the introduction above). Thompson (1990) has five 10 km square records for the pipistrelle within the Yorkshire part of the study area. Figure 1 is based on 43 records. Similarly Howes and Thompson (1985) have one record for the brown long-eared bat (there are ten records in Figure 2) and no records for Natterer's, Brandt's or Daubenton's bat in the area covered in this survey. Brief notes on the status of bats in the old county of Durham (vice-county 66) published by Jackson and Hinchcliffe (1986) do not include distribution maps. All five species under consideration are represented as present in the study area in national distribution maps (Corbet & Harris 1991); hence the information presented in this paper does not represent any extension of the known ranges of these species, but rather adds to knowledge of their status within these. (All records from this survey have been submitted to the Biological Records Centre at the end of the calendar year in which the site was first located.) The abundance of the pipistrelle on a national scale, relative to other bat species, must surely be related to its greater ability to exploit dwelling houses as roost sites.

Regarding the sites selected as nursery roosts by female pipistrelles, there is a clear statistical bias towards occupation of two-storey buildings, specifically behind soffit boards (Tables 3 and 4). The data on age of sites (mean 37.2 years, revised to 15.4 years) seem to be in line with national findings, eg. Richardson (1985) states that at the time of his writing, 80% of pipistrelle roosts found in the Northamptonshire area were in houses built since 1960. In the present study 74.4% (revised figure 91.4%) of roosts were in buildings aged 25 years or less. The significance of these figures is hard to evaluate. The bats may be simply exploiting what is available rather than deliberately selecting newer houses.

Interestingly, the direction faced by pipistrelle nursery roosts showed no marked trend (Figure 4). However, only eight sites face north-west to north-east inclusive, compared with a total of 29 facing other directions. This is just statistically significant (χ^2 squared = 3.98 P < 0.05). Avery (1991) states "nursery roosts are often in modern buildings, usually south or south-west facing, presumably chosen partly for their warmth". Thompson (1990) suggests that bats may use roosts according to their temperature requirements, as the females tend to be heterothermic early in pregnancy, using north facing roosts, and homeothermic during mid-pregnancy and lactation when they move to south facing roosts. Data collected in the present study are too few to comment on this point, which requires further investigation. The matter has the added complication that in late pregnancy, when the foetus takes up most of the abdomen, the female cannot eat a great deal and so may become heterothermic again (Stebbins 1986). This may result in further movement between roosts.

Occupation of summer roosts (Table 5) shows a clear peak from late June to early August. Young are usually born in the second half of June or early July and first fly when three weeks old, after which the colony soon disperses (Stebbins 1991). The earliest date

on which bats were recorded in the present study was for twelve animals at a site on 25th April 1987. The latest record in the year was for six bats on 20th September 1987, interestingly, at the same roost. Thompson (1990) records 18th May 1982 and 8th September 1979 as first and last dates for the York area. Peak counts (Table 6) occurred from late June to late July inclusive with an apparent earlier peak during late May. The latter would be less marked but for a single count of 416 animals at a site in a wall cavity in the exterior of a church. If this count is excluded, the mean for late May is then 58.0 ± 37.8 . Similarly two unusually high counts (88 and 124) were made at one roost site in early June and if these are excluded then the mean for this period is 15.4 ± 17.7 . Although these alterations to the data are subjective it is felt that the revised figures serve to reflect more fairly a pattern of high counts in May followed by generally fewer bats present during early June, before the principal peak in numbers in late June to late July inclusive. Similar occupation patterns have been observed elsewhere (eg Richardson 1984) and perhaps reflect changes in thermoregulatory behaviour related to the reproductive cycle, as outlined above, with a period of dispersion during late pregnancy when the animals may become heterothermic. This is clearly a significant aspect of the life of the pipistrelle which requires further study.

The data summarised in Table 7, the means for maximum annual counts, are probably too few to reflect reliably any genuine fluctuation between years because individual sites were not visited with sufficient frequency to estimate accurately the maximum number of animals present; thus the true peak at any give site may well have been missed. The overall mean for all maximum counts made during the nine year period is 85.3 ± 72.9 . Avery (1991) states that maternity roosts can hold up to 1000 bats but that 1 to 200 are much more common, with an average of about 60. In the Vale of York, for the period 1977 to 1983 Howes and Thompson (1985) located eleven stable colonies which usually contained 50 to 100 bats. For Great Britain, Stebbings and Arnold (1992) report mean numbers of pipistrelles emerging from roost sites as 111 ± 9 for 1990 and 100 ± 8 for 1991 ($n = 342$). These figures are based on counts made in June (ie. all adults). Their survey indicates considerable regional variation, with sizes for northern England of 102 ± 13 and 85 ± 11 for 1990 and 1991 respectively ($n = 69$).

Regarding species other than the pipistrelle, sites occupied by the brown long-eared bat (Table 8) are typically more rural and the buildings older, generally of the order of 100 years or more in age. Specific dates of construction have been difficult to obtain but in any case the roof voids inhabited are not necessarily of the same age as the rest of the building at these older sites. This overall pattern seems to be typical of that found nationally.

Data for the *Myotis* species (Table 9) are few due to the paucity of sites located – a point of interest in itself. It is envisaged that further information about these roosts will form the basis of future publications. The two sites occupied by Daubenton's bats are of interest since both are in bridge archways, on the underside, where in one case a lateral extension has been added in the past to widen the bridge. Similar sites are known elsewhere, for example in Hampshire (Goodall 1986). In Durham, Jackson and Hinchcliffe (1986) report three roost sites for Daubenton's bat (data for one of which, at Croft-on-Tees just inside vice-county 65, is included in Table 9), one nursery roost for Natterer's bat (again that which is included in Table 9 since it is in Cleveland county) and four roosts for Brandt's bat. In Yorkshire, records for these three species seem to be sparse in general (Howes & Thompson 1985) especially for Brandt's bat which has been recognised as distinct from the whiskered bat (*Myotis mystacinus*) only since 1970.

Other species of bat which may well breed in the study area include the whiskered bat which seems to be not uncommon in the Durham area (Jackson & Hinchcliffe 1986). An individual of this species was found near Eaglescliffe, Cleveland (GR 45/39.14) on 22nd August 1988. It is equally surprising that no roosts of the noctule bat (*Nyctalus noctula*) have been located. Two individuals were caught accidentally in bird ringers' mist nets at Salthome Pools, Cleveland (GR 45/504.224) on 1st September, 1969 and one was found in a moribund condition at Hartlepool Headland (GR 45/531.341) on 23rd April 1971 (R. T.

McAndrew, *pers. comm.*). What is undoubtedly this species can be seen regularly during summer months, feeding at dusk at a number of riparian habitats in the study area. Jackson and Hinchcliffe (1986) reported thirteen noctule roosts in Durham whilst records for Yorkshire are widely spread but with a southerly bias (Howes & Thompson 1985).

The chance of any other British bat species being resident in the study area seems to be very slim; however it is perhaps worth noting that in the past, the barbastelle (*Barbastella barbastellus*) and the lesser horseshoe bat (*Rhinolophus hipposideros*) have been recorded as far north as Helmsley in Yorkshire (Howes & Thompson 1985) and Leisler's bat (*Nyctalus leisleri*) occurs in the Sheffield area (Whiteley 1985).

Finally, it is of interest to note that a female Nathusius' pipistrelle (*Pipistrellus nathusii*) was found at Teesport (GR 45/54.23) on 26th April, 1991. It seems highly likely that this animal arrived in Britain by ship but regrettably this could not be ascertained for certain. Only three records of this highly migratory species are listed for mainland Britain by Racey (1991). Hutson (1991) mentions in passing one further individual found in Bristol.

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HISTORICAL NOTES ON THE STARLING *STURNUS VULGARIS* IN YORKSHIRE

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'*Ill have a starling shall be taught to speak*'.

Henry IV, part 1, Wm. Shakespeare

INTRODUCTION AND SOURCES

With technological, commercial and economic developments being capable of profoundly altering patterns of landscape and biogeography, environmental monitoring is currently of considerable public and political concern. Investigations into long term status changes of birds, mammals and other organisms are, however, severely hampered by the paucity or absence of documentary evidence prior to the mid-19th century. 'Vermin' bounty payments entered in the annual accounts of churchwardens and other parish or township officials from the late 16th to the mid-19th centuries are now known to form a rich source of provenanced, dated, and statistically based records of a range of mammal and bird species in England and Wales for a period when there is otherwise little information other than vague or subjective anecdotal comments (Howes 1984).

An extensive examination of these sources in Yorkshire has to date identified documents relating to some 57 parishes and townships containing bird or mammal 'vermin' bounty payment records (Howes 1984 & unpublished). Although a wide range of mammal species (12 to date) is alluded to, bounties for birds refer almost exclusively to 'sparrows', presumably house sparrows *Passer domesticus* and are confined largely to the late 18th to mid-19th centuries. However, very occasional references to 'crows' Corvidae (from 1587 to 1726), jackdaws *Corvus monedula* (1646), 'owls' Tytonidae and/or Strigidae (from 1642 to 1736), bullfinch *Pyrrhula pyrrhula* (1590) and starlings *Sturnus vulgaris* (1690 and 1709) have been traced, providing some of the earliest documentary references to these taxa in the Yorkshire region.

EARLIEST YORKSHIRE RECORDS OF STARLING

The earliest generally accepted, though rather tenuous allusion is Ralph Johnson's comment, quoted in Willughby's *Ornithology* (Ray 1678), that he never saw starlings eat berries. Since Johnson corresponded with Willughby from Brignall near Greta Bridge (then in Yorkshire), this has been taken as evidence that his observations had been made within the county (Nelson 1907, Mather 1987).

The following references, being accompanied by locations and dates, provide additional and perhaps sounder proof for starlings being part of the Yorkshire fauna during the 17th and early 18th centuries.

The churchwardens' accounts for the parish of St Mary's Beverley from 1592 to 1724 (HCAO PE 1/51-113) show that in 1690 11d. was paid for a stone of hair (probably used as a binding agent in mortar for building repairs) and shooting starlings.

The churchwardens' accounts for the parish of Bedale from 1668 to 1734 and 1767 to 1890 (NYCRO PR/Bed 2/2 Microfilm no. 995) show that in 1709 payment was made for 'killing stamils' (one of the many Yorkshire vernacular terms for starling).

The writings of the celebrated Yorkshire naturalist and diarist Charles Fothergill (1782-1840) of Wensleydale provide a further significant historical allusion to starlings from an otherwise poorly documented period. His excursion through the East Riding to Flamborough in 1805 brought him on 2nd June to Driffield. His diary entries for the occasion refer to a local informant describing the "*myriads of starlings which roosted amongst the reeds*" in the carland along the Driffield Beck at Wansford. This was not the case on the occasion of Fothergill's visit, and though a post breeding roost seems to have

been present, his notes record that “*The stories . . . I find not untrue but since the highest reeds have been cut down they are not so numerous*” (Romney 1984).

STATUS CHANGES

The payment of bounties for the killing of starlings during two relatively close dates and in two widely separated parishes (Beverley (TA/0339) on the eastern edge of the Wolds and Bedale (SE/2688) at the foot of Wensleydale), may suggest that throughout the Yorkshire region at the close of the 17th and commencement of the 18th centuries, they may have been sufficiently numerous to be regarded as ‘pests’.

Referring to later fluctuations in the status and distribution of the starling, Sharrock (1976), following the researches of Parslow (1973), commented that few birdwatchers today imagine that during the early 19th century this currently ubiquitous bird apparently declined over the whole of Britain, and retreated from most of Scotland and Ireland as well as West Wales and South west England.

The ‘revival’ to the starling’s present status was judged to have commenced between the 1830s and 1880s with parts of northern England being the first to be recolonised (Parslow 1973, Sharrock 1976).

Although broadly following this pattern, historical evidence presented here suggests that the 19th century rise in status seems to have been well under way in the Yorkshire region before the 1830s.

Fothergill’s anecdote and observation indicate a post breeding (rather than an autumn migration) concentration, at least in the Driffield region of East Yorkshire by 1805. By 1844 in Yorkshire generally, Thomas Allis (in Nelson 1907) observed that the starling was already “universally common” and Nelson (*loc. cit.*) reported that “*its numbers have, subsequent to that period [the 1840s] multiplied almost beyond belief*”.

Commenting on the period 1845 to 1876 around Wakefield, Talbot (1877) judged the starling to be “. . . exceedingly common all year round. It is a great friend of the farmer, and richly deserves all the encouragement and protection he can give it; it renders him great assistance in clearing the land of mischievous insects.”

By the late 19th century, Clarke and Roebuck (1881) described it as “resident, generally distributed, abundant” in Yorkshire, and Nelson (1907) confirmed that during this period the starling was “. . . one of our commonest and most generally distributed residents”.

By 1866 its recolonisation throughout Britain appears to have been complete, Morris (1866) writing that “*In our own country it is everywhere to be met with . . .*” A little more than a century later, according to data collated for the *Atlas of Breeding Birds in Britain and Ireland* (Sharrock 1976), the starling was found to represent the fifth most widespread bird in Britain and Ireland. It occurred in 3,707 (96%) of available 10-km squares and with nesting confirmed in 98% of these, was shown to breed in more ten kilometre squares than any other species.

I would like to thank the County Archivists of North Humberside and North Yorkshire for study facilities and permission to publish the above archival records.

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BOOK REVIEWS

A Key to the Woodlice of Britain and Ireland by Stephen P. Hopkin. Pp. 54 with 32 colour plates. Field Studies Council, Preston Montford, Montford Bridge, Shrewsbury SY4 1HW 1991. £4.75 Post paid.

This AIDGAP publication is one which even someone with no knowledge whatsoever of the order can pick up, make sense of, master, use and enjoy without the frustrations normally associated with identification keys.

It is lavishly illustrated with unusually clear annotated line drawings, not to mention the real-life colour photographs of all but the rarest species. Descriptions are limited to the 37 native and naturalised species and confusion which has occurred in the past by inclusion of hot-house aliens is eliminated.

It is not just an identification key as there is sufficient reference to historical aspects, biology, ecology, collecting, preservation, preparation of microscope slides and the Isopod recording scheme to fire the imagination of most and there is also a very fine glossary and list of further reading. Errors are few and far between: scale bars given on Fig. 9 p. 613 should read 0.4 mm not 4 mm and the scale which should read 0.1 mm is omitted from Figures 12a and 12b on page 616.

The book is excellent value for money, even if only for its magnificent colour photographs. There is little doubt that it will generate interest in terrestrial isopods in general and will see us through well into the next century.

DTR

Weevils by M. G. Morris. Pp. 76, many text figures and 4 colour plates. Naturalists' Handbook no. 16, Richmond Publishing, 1991. £12.00 hardback, £5.99 paperback.

The aim of the books in this series is to provide the investigator with a means of discovering more about the natural history of a particular group of organisms. This has been achieved by conveying what is already known about a group and highlighting topics on which further research would pay dividends. In this book the writer openly admits that we are still ignorant of several aspects of weevil life histories.

With a group as large as the weevils (about 570 British species) much condensing has had to occur to reduce the group to a manageable size. The book therefore only encompasses the weevils that are found on a selection of food plants (Hazel, Beech, Gorse, Figwort etc.). The 25 pages devoted to biological information are crammed with fascinating facts and should be a tremendous source of reference, even to the most dedicated weevil buff. I have never had a satisfactory answer to the question of which Scolytids carry Dutch Elm Disease – now I know! The section on Identification relies heavily on the finder's ability to identify the food plant and only covers weevils known to be feeding on the plant host. Difficulty would arise should an alien species be encountered on the food plant mentioned ie. both *Phyllobius pyri* and *Otiorrhynchus singularis*, which are not mentioned in the keys, are cosmopolitan species which can be found feeding on a wide variety of plant species. Keys of this nature are of limited use and only frustrate the beginner who cannot identify the specimen to species level.

The section on Collecting and techniques for study contains a wealth of information that the would-be weevil hunter will find advantageous. It is rather surprising, however, that the writer does not place more emphasis on the use of reference collections when identifying to species level. It is all too easy to determine an unfamiliar species by using a Key and then find your identification incorrect when it is compared with a correctly named specimen. Many spurious names will follow if a species is simply keyed out and comparative material is not utilized.

The main plates, by Miranda Gray and Anthony J. Hopkins, are very pleasing but would have benefitted from being drawn in lifelike positions rather than as museum type specimens. The text figures by R. W. J. Read, despite being drawn in the same fashion, are a good representation of the species depicted.

In writing this book, M. G. Morris has made a bold attempt to cover what is a very difficult group. Apart from the few misgivings mentioned above, he has succeeded admirably and there is much to be learned from this well researched and well written account on weevils.

MLD

New Flora of the British Isles by Clive Stace, with illustrations mainly by Hilli Thompson. Pp. xxx + 1226 (including numerous illustrations), plus end-paper maps. Cambridge University Press. 1992. £24.95, flexi-covers.

Those of us who have grown up with CTW (Clapham, Tutin & Warburg), now CTM (Clapham, Tutin & Moore), may question the need for a "new flora", but Clive Stace has provided us with a truly new and innovative guide which may well prove more useful in the field: CTM with a volume of 1,900 cm³ weighs in at 1.4 kg, whereas Stace has a volume of 1550 cm³ and weighs 1.25kg; furthermore, its value as a conservationist's field guide is enhanced by highlighting rare species which should not be damaged or collected – only possible for some by on-the-spot diagnosis via keys.

A bold attempt has been made to cover all native and naturalised plants, crops and recent casuals (2,990 species & 197 subspecies fully; 559 hybrids & 564 marginals briefly) within 1,178 pages of text which includes 150 pages of line drawing and/or photographic illustrations. Frequently encountered taxonomic problems are addressed by new keys at the family, generic and species level. The work is essentially a detailed key, and although, compared to CTM, there is some loss of taxonomic and other detail, and line spacing tends to cramp the text, the type is clear and the volume contains a very considerable body of information within its compass.

The flora is the culmination of nine years' dedicated labour. Botanists, ecologists and plant-lovers in general owe the author a deep debt of gratitude for providing us with an invaluable new tool with which to interpret the richness of our country's flora.

MRDS

The Walker's Guide to Swaledale by A. David Leather (Pp. xiii + 130, 1992), . . . to **Three Peaks and Malhamdale** by W. R. Mitchell (Pp. xiii + 129, 1992), . . . to **Wensleydale** by A. David Leather (Pp. xi + 130, 1991), . . . to **Wharfedale** by A. David Leather (Pp. xi + 132, 1991). Smith, Settle. £6.95 each.

Without doubt the Yorkshire Dales offer the walker some of the most beautiful and interesting terrain in Britain and this series of guides takes the visitor by the hand along about twenty walks (3-12 miles) in each dale, pointing out features of particular interest on the way. Timings are given as well as explicit directions for parking and route finding. Each volume has an introductory section covering local geology, pre-history, history, industry, landscape, flora and wild life all illustrated by maps, sketches, paintings and some excellent photographs. These well produced pocket-sized guides provide invaluable aides to the newcomer and welcome additions to the walker's bookshelf.

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To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record his deep appreciation of this imaginative gesture.

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F. O. MORRIS'S LIST OF YORKSHIRE BIRDS

MARTIN LIMBERT

Museum and Art Gallery, Doncaster DN1 2AE

INTRODUCTION

In 1844, Thomas Allis Snr (1788–1875) presented an appraisal of the birds of Yorkshire to a meeting in York of the British Association for the Advancement of Science. Although an abstract appeared in print,¹ his full manuscript subsequently lay unpublished until 1907. However, W. Pumphrey, Allis's son-in-law, granted William Eagle Clarke access to the script, in order that the latter could quote from it to enhance his own synopsis of the Yorkshire avifauna.² In the uncompleted account of Yorkshire birds written by Clarke³ and Clarke and Nelson,⁴ the relevant details from Allis were included *verbatim* under each species, a practice re-employed in Nelson's two valedictory work of 1907.⁵ Once finally published in total and formalised in this way, Allis's work took its prominent place in the history of Yorkshire ornithology, with the original manuscript housed by the Yorkshire Museum at York. Since Allis's list became so widely available, it tends to be seen uncritically as the first to embrace Yorkshire, and consequently is regarded as a convenient, if arbitrary, starting point for the county's ornithological history. For example, Nelson noted Allis's list as the "earliest Yorkshire one", and more recently, Wallis⁶ began his account of the development of ornithology with Allis. Yet it is clear from perusing the literature associated with the county's avifauna that pre-1844 interest in birds was substantial and sustained, as can be inferred from the ability and desire to produce a relatively detailed and structured review in 1844. For example, several species were added to the British list from pre-1844 Yorkshire specimens, commencing with Waxwing in 1681.⁷ An examination of the Yorkshire section in Mullens *et al.*⁸ provides a bibliographical view of this earlier interest.

The formative years of Yorkshire ornithology constitute a significant aspect of the development of interest in the county's natural history. This is particularly true in seeking to understand the origins of the perception of Yorkshire as a functional, if unscientific, biogeographic unit. The first review of the Yorkshire avifauna has long been regarded as Allis's contribution of 1844. However, in reading it, as given in Nelson, clues to an earlier statement are unwittingly provided, though no such compilation is included by Christy⁹ or Mullens *et al.*¹⁰ This preceding summation, frequently used by Allis, was assembled by the Rev. Francis Orpen Morris. Allis actually referred to Morris's list or catalogue of Yorkshire birds, and in his account of Cirl Bunting, stated that it had appeared in the *Doncaster Journal* in December 1840. A further hint of the existence of a list of sorts was provided by Edwin Lankester in his book on the Askern district.¹¹ In furnishing an annotated list of the rarer birds of the area, he noted that the inclusion of Golden Eagle was based on an entry in "a catalogue of the Birds of the West Riding of Yorkshire, kindly sent me by the Rev. F. O. Morris, of Ordsall". However, despite investigation, the list(s) began to seem apocryphal as, even in Doncaster, no suitably dated periodical named the *Doncaster Journal* could be traced. The eventual answer was suggested by a librarian at Doncaster Central Library: could it be an erroneous citation of the *Doncaster Chronicle and Farmers' Journal*, which first appeared in 1836? Checking the library's microfilm stock quickly led to Morris's contribution printed in the above newspaper for 26 December 1840.

BIOGRAPHICAL OUTLINE

The Rev Francis Orpen Morris (Figure 1) is a relatively well-documented zoophilist, naturalist and writer. He was a tireless campaigner, especially for animal welfare and bird protection, though embracing a wide spectrum of causes over many years. This, and his prolific natural history output, combined to give him fame as a popular naturalist, surpassed only by another cleric, the Rev. J. G. Wood. The most detailed account of

Morris's life is that by his youngest son, the Rev. M. C. F. Morris,¹² from which much of this section is derived.

Born in 1810 in Co. Cork, Francis Morris was educated at Bromsgrove School in Worcestershire where he first began in earnest to form collections of birds and insects. In 1828, he went to a private tutor in Berkshire, before proceeding to Worcester College, Oxford, from where he graduated B.A. in Classics in 1833. On leaving Oxford, Morris prepared to take Holy Orders, and obtained a title to the curacy of Hanging Heaton near Dewsbury in 1834. In the same year he was ordained deacon, and his first publication appeared, a 20-page label-list of the birds of the British Isles.¹³ However, he did not remain long at Hanging Heaton, subsequently taking up the curacy of Taxal in Cheshire for three months.



FIGURE 1
Rev. F. O. Morris, from an unidentified engraving.

In 1835 Morris married, and was ordained priest at York. In October of that year he became assistant curate of Armthorpe and Christ Church, Doncaster, under the Rev. Henry John Branson. Morris lived at Beechfield House where he remained for two years, finding time alongside his clerical duties "to pursue and cultivate his taste as a naturalist, the neighbourhood of Doncaster being by no means an unfavourable one for the purpose".¹⁴ Another of his early literary contributions, on Hatfield Chase, appeared in *The Naturalist* in 1836.¹⁵ He became a member of the Doncaster Lyceum,¹⁶ a brilliant but relatively short-lived scientific meteor that attracted the leading local naturalists of the day. Here he made the fortunate acquaintance of men like Neville Wood and Edwin Lankester, though his most profitable contact proved to be with Hugh Reid. The latter, like Morris, was primarily an ornithologist and lepidopterist, and was in business in the town as a natural history dealer and taxidermist. Reid was by far the most important source of Doncaster bird records in the 19th century, featuring strongly in Morris's Yorkshire list, which was compiled during his residence in the town.

Morris subsequently ministered at Ordsall near East Retford in Nottinghamshire, and at Crambe, between York and Malton. In 1844, he was presented to the living at Nafferton, close to Driffield, and was appointed chaplain to the Duke of Cleveland. It was at Nafferton that his literary work developed, and he began to reap fame as a writer. He was

exceedingly fortunate that close by, in Driffield, lived Benjamin Fawcett, one of the most skilled engravers and colour printers, capable of executing fine illustrations.¹⁷ Morris's *Bible Natural History* appeared in 20 monthly parts in 1849–50, succeeded by his *Book of Natural History*, completed in 1852. A *History of British Butterflies* followed, available in 18 parts during 1852–53. A *History of British Birds* and *A Natural History of the Nests and Eggs of British Birds* were much larger undertakings, being issued from 1850 and 1852 respectively. Neither was complete when Morris quit Nafferton in 1854 for Nunburnholme, a Wolds-edge parish to the east of Pocklington, a living he held until his death in 1893.

Although Morris continued to write prolifically on a range of subjects, his name always remained most familiar as that of a naturalist. A *History of British Birds* was completed with its ninetieth part, in 1857. It sold well for years, and went through six editions (including a 'cabinet' edition). However, Mullens and Swann¹⁸ retrospectively remarked of Morris's *British Birds*:

His *magnus opus* is, of course, his *History of British Birds*, and of this it may be said that, although one of the most voluminous and popular works on the subject, and financially most successful . . . yet it has never occupied any very important positions among the histories of British birds. Morris was too voluminous to be accurate, and too didactic to be scientific. He accepted records and statements without discrimination, and consequently his work abounds with errors and mistakes. Yet as a book for the amateur ornithologist it has charmed and delighted for more than half a century, and it had for many years the great merit of being almost the only work at a moderate price to give a fairly accurate and coloured figure of every species . . . so that Morris has a name and a place in British ornithological history despite the observations we have made above.

Morris sustained his natural history output throughout his years at Nunburnholme, including his last great kindred work, *A Natural History of British Moths*, which was issued between 1859 and 1870. He also maintained a vigorous correspondence with newspapers and periodicals, much of it being subsequently marshalled into book form. Despite all this, and the comment of Mullens and Swann *antea*, his endeavours seem not to have led ultimately to personal affluence. In 1888, he was awarded a Civil List pension of £100 annually, "in recognition of his merits as a naturalist, and of his inadequate means of support".¹⁹ These payments partly acknowledged his seminal role in the evolution of bird protection. Within a Yorkshire context, of particular interest is his part in the creation of the Association for the Protection of Sea Birds. This was aimed at eliminating the shooting of nesting seabirds perpetrated by 'sportsmen' at Flamborough and Bempton. The resultant Sea-birds Preservation Act of 1869 was the forerunner of all similar legislation.²⁰ F. O. Morris's main contributions to Yorkshire ornithology, though ironically not his 1840 list, are itemised in Mullens *et al.*²¹ He became a subscriber to the Yorkshire Naturalists' Union in 1877²². In addition, he also edited three volumes of an early series of *The Naturalist* (1856–58), and its short-lived successor, *The Magazine of Natural History and Naturalist* (1860).²³

F. O. MORRIS'S YORKSHIRE BIRD LIST: AN INTRODUCTION

The list in the *Doncaster Chronicle and Farmers' Journal* begins:

A CATALOGUE OF BRITISH BIRDS
WHICH HAVE OCCURRED AT DIFFERENT TIMES IN
YORKSHIRE, BY THE REV. F. O. MORRIS, B.A.

.

TO THE EDITOR OF THE DONCASTER CHRONICLE

Sir, — If you think that the following catalogue of the Birds of / Yorkshire would be interesting to those of your readers who are / attached to the study of Natural History, it is much at your / service. I compiled it three or four years ago, which will partly / perhaps account for any omissions there may be, as recent discoveries / may have added new species to our Yorkshire Fauna. I have every / reason to believe that the particulars respecting the individuals / named are correct.

I am Sir, your very obedient servant,
FRANCIS ORPEN MORRIS

The numbers [omitted in the republished list *postea*] refer to my guide to an arrangement of British Birds.

December 3, 1840.

The list itself requires little general introduction. It particularly reflects Morris's years in Doncaster, but includes a number of records from elsewhere in the county (Figure 2).



FIGURE 2

Locations named in the 1840 list, Doncaster places omitted. All unmapped sites are within the study area of the Doncaster & District Ornithological Society, a ten miles (16.09 km) radius of Doncaster Museum.

Earlier comments on Morris's uncritical approach to records can have little practical impact now, and his records have simply to be used with this in mind. It is not an exhaustive treatment; indeed, there are some odd omissions, for example amongst the geese, terns and wagtails. In his preamble, Morris largely disarms some potential criticism by his indirect admission that recent additions to the Yorkshire avifauna would only partially account for any gaps. There were, for example, earlier Yorkshire records of Barnacle Goose *Branta leucopsis* and Brent Goose *B. bernicla* in a standard published

work,²⁴ neither of which Morris used. His list was clearly a summary of data which were to hand, and not the result of detailed research.

Morris implied that he had compiled the records in 1836/37 ("three or four years ago"). Although he also suggested that they had not been revised in the interval between compilation and publication, at least two extra details were inserted from this latter period: a possible Golden Eagle shot in 1838, and a Grey Phalarope "shot at Rossington in 1836, now (1838) in the possession of Mr. Reid, of Doncaster". This latter bird was recorded by Morris as a Red-necked Phalarope *Phalaropus lobatus*. However, Thomas Allis wrote that he had been informed by Hugh Reid that the bird in question was a summer-plumaged Grey Phalarope, hence its typification here. As it must be accepted that the data were not substantially updated, Morris's statements have to be put at 1836/37. This has implications for Allis's dating, or lack of such, of records derived from Morris's list. Three examples are given, the first concerning the last breeding of Red Kite near Doncaster.

In his 1844 paper, Allis particularised the event as "About twenty years ago" (i.e. c.1824). As Morris gave the record as "sixteen years ago", Allis had simply added four years on to 1840, the year of publication of Morris's list. Yet, accepting the latter work as a product of 1836/37, it is obviously possible to date more accurately this last authentic Yorkshire Kite's nest to c.1820/21. Similarly, Allis wrote of Red-legged Partridge: "Several have been killed near Doncaster". Hitherto, this statement has provided the assumption that the first evidence of the species in Yorkshire is of pre-1844 date. Although this is still true, the dates can now be slightly refined. An identical remark had already been made by Morris, from which Allis's must have been derived. The dating of the first recorded Yorkshire occurrence is thus actually pre-1836/37.

The third example, and potentially the most interesting, involves Black-tailed Godwit, which Morris stated "Breeds on the edge of Hatfield Moor". This would seem to suggest that the bird was still nesting in Yorkshire in the mid-1830s, when Morris lived in Doncaster, though it is conceivable that the information could have been misunderstood in some way and mistakenly transferred to the mid-1830s. However, at that time Morris was in regular receipt of information from Hugh Reid, who is known to have found Godwit chicks on Hatfield Moors, though the year is not recorded.²⁵ There is no good evidence to say when nesting ceased in Yorkshire, although Hatfield Moors was probably the last site. Others from that period were Potteric Carr²⁶ and perhaps the East Riding carrs²⁷. The end of Yorkshire breeding has been put at dates as disparate as 1829²⁸ and nearer the middle of that century,²⁹ these extremes being apparently derived from mis-reading the earlier evidence of Witherby *et al.*³⁰ and More³¹ respectively. Morris's tantalising wording seems to be the strongest evidence to put breeding into the mid-1830s. This is made more likely by his statement that Ruff was common "20 years ago on Hatfield Moor", which renders his Godwit comment specific, and not a replicated, more generalised one.

It is now, a century and a half later, no longer possible to directly assess F. O. Morris's records unless reliably labelled specimens exist. Nevertheless, intelligent filleting will pick out those records which are either apparently mistaken, or may be questioned in some other way. Four cases from the Doncaster district are given here to illustrate the problem: Harlequin Duck, Buzzard, Red-footed Falcon and Jack Snipe. Each exemplifies the dangers of the unguarded interpretation of old bird records, which so frequently prove to be invested with at least some element of doubt or confusion.

The Harlequin Duck, shot – though Morris's list does not say so – near Doncaster, is a particularly unlikely occurrence. In a recent review³² of extralimital European records, only 30 individuals had convincing and usable data. Many other claims, like that from Doncaster, are either unsatisfactory or have been proved to be mistaken. The evidence for the Doncaster record, as published 1840-81,³³ is that a female duck, apparently considered or claimed to be a Harlequin Duck, was shot on the River Don, near Doncaster, on an unrecorded date by a Mr. Cartmel/Cartwell. It was sold (but not, as Morris asserts, shot) by Hugh Reid, the authority for the identification, to the Rev. Nathaniel Constantine Strickland. In 1838, Stirckland sold c. 1700 bird skins to his brother Arthur Strickland and

cousin Hugh Edwin Strickland, and in 1850 the latter also acquired those which had been purchased by Arthur Strickland. The University of Cambridge was presented with the H. E. Strickland Collection in 1867, and currently houses it within the Department of Zoology. Its published catalogue³⁴ includes only a single Harlequin Duck, from Iceland. However, further unlisted ones are held, and where data exist, it can be established that, predictably, these have Icelandic or Canadian origins. Thus the relevant Doncaster specimen is not easily traced. Hugh Reid's reputation is such that deliberate fraud in naming the specimen seems unlikely. There is no other evidence to impugn his trustworthiness, and he was described by Nelson³⁵ as "a first-rate and thoroughly reliable ornithologist". However, genuine mistakes are made, and it is at least possible that the supposed Harlequin Duck, being a female, might actually have been a Long-tailed Duck, a much more likely species to turn up anywhere in Europe. Gurney³⁶ added that early authors did not appreciate the rarity of the Harlequin Duck in Britain, citing comments by William Yarrell ("frequently captured") and John Gould ("more rare than the Long-tailed Duck"), neither of them stressing the caution required when claiming the rarer species. The darkest female and juvenile Long-tailed Ducks can have a facial pattern approaching that of Harlequin Duck, which may lead to faulty identification if taken in isolation. Confusion between Harlequin Duck and allied species was probably first stressed by Newton,³⁷ with Howard Saunders, in Yarrell,³⁸ observing that "all the young or female 'Harlequins' which have from time to time been recorded, have been proved, where proof was possible, to be Long-tailed Ducks". Regrettably, such an explanation for the Doncaster record cannot be substantiated. An investigation of the Long-tailed Ducks in the H. E. Strickland Collection at Cambridge revealed no Doncaster example, correctly re-determined, or even one inadequately documented which could be suspected as being linked with the town.³⁹

Thus, in the absence of evidence of identification error, are any other explanations for the Harlequin Duck possible? As the 'escape' likelihood in the early 19th century does not exist, the only other course of enquiry seems to be that of a confusion of names. Did Hugh Reid, as the authority for identification, actually mean *Histrionicus histrionicus* when naming it a 'Harlequin', irrespective of its later characterisation by others relying on the indirect information? The main possibility is that explained by Newton,⁴⁰ who stated that the Wood Duck *Aix sponsa* was often called the 'harlequin' by dealers, because of the male's "beautifully variegated plumage". The Wood Duck, a native of North America, was established and breeding in England by the beginning of the 19th century. As it was not a British species, anyone encountering one who did not have access to literature on American birds was forced to rely on other sources of advice, including aviculturists and dealers. In the *Zoologist*, Briggs⁴¹ gave an account of a pair of "Harlequin Ducks (*An[als] histrionica*)" breeding in a semi-domesticated state in Derbyshire in 1849, with Newton⁴² confidently expressing his opinion that the birds in question were almost certainly Wood Ducks. Later, Saunders⁴³ observed that even examples of 'Harlequin Ducks' which had been recorded as adult males "have proved to be examples of the American Wood Duck or some other species". Was therefore the Doncaster 'Harlequin' an errant female Wood Duck from captivity? It is a beguiling possibility, which seems at least as reasonable as any other.

It is likely that Morris's allusion to the Buzzard being "Plentiful near Doncaster" arose from confusion with the local occurrence of Marsh Harrier, which was once a regular breeding denizen of the wetlands east of Doncaster.⁴⁴ From the time of Francis Willughby,⁴⁵ English writers referred to this harrier as the 'Moo,-Buzzard' or a derivative, Alfred Newton⁴⁶ in the early 1870s describing the name 'Marsh-Harrier' as "a book-name of comparatively modern application"; it was probably first coined in the 1820s.⁴⁷ As a tree-nesting species, the true Buzzard was admittedly once a more frequent species in eastern counties, for example being noted as "Formerly a common resident in the woodlands" of Lincolnshire,⁴⁸ but it seems never to have been "Plentiful" near Doncaster. Indeed, historical research has located only two single 19th century records (1846, c. 1890), with no hint of breeding.⁴⁹ There can be little doubt that the 1840 comment was, mistakenly, a

reflection of the status of the Marsh Harrier in the area, which Morris described in the same list as "Not uncommon" on the Doncaster lowlands.

It is clearly likely that Morris's pair of Red-footed Falcons from "near Doncaster" were actually Hobbies, the redness of the latter species' tibial feathering perhaps not being fully appreciated by those encountering the birds. The rarer species had only been added to the British list in 1830, when a spring influx resulted in five specimens being recorded in England, all of them in Norfolk⁵⁰ except the first, omitted by Morris, which was shot near Doncaster in April of that year.⁵¹ It follows that the subsequent Doncaster pair must have been recorded in the 1830s, at a time when, on Morris's own admission, Hobbies were breeding locally. It is worth remembering that he "accepted records and statements without discrimination",⁵² and it is thus likely that an erroneous or even fraudulent claim was inadvisedly received. At that time, an awareness of the new British falcon was perhaps causing – at least in some quarters – a muddled appraisal of 'red' falcons in Britain.

A further problem is demonstrated by Morris's allusion to Jack Snipe ("Breeds near Doncaster sometimes"), which was dismissed long ago as a misinterpretation of names, though it is worth trying to understand why. Yarrell⁵³ reiterated an allegation of nesting at an unspecified Yorkshire locality, and the situation was compounded by Allis⁵⁴ in the following year, who added further records and repeated the Doncaster claim. However, in the early part of the 19th century, it was widely accepted that the Jack Snipe did at least occasionally breed in Britain. These claims were largely based on the occurrence of birds outside the main periods of migration, and on the identification of alleged or assumed clutches of superficially plausible eggs. There was also confusion about the colloquial name 'jack snipe'. The Dunlin sometimes attracted this vernacular diminutive, simply as a smaller wader breeding in Snipe country, as in Shetland where parallel breeding claims have been made.⁵⁵ Even the name 'snipe' was once a more generalised term than its present limited usage in the western Palearctic would suggest. Morris⁵⁶ himself documented amongst the alternative names for the waders he described, Least Snipe (dowitchers *Limnodromus*), Red-breasted Snipe (dowitchers and Bar-tailed Godwit), Jadreka Snipe (Black-tailed Godwit), Spotted, Black-headed, Courland and Dusky Snipe (all Spotted Redshank *Tringa erythropus*), Pool Snipe (Redshank) and Summer Snipe (Common Sandpiper).

Morris's acceptance that the Jack Snipe sometimes bred near Doncaster probably arose through the unguarded local use of this name. If Dunlin is accepted as the species in question, this suggests Thorne Moors as the site involved. The moorland was the only known Doncaster breeding station of Dunlin, as particularised by Limbert *et al.*⁵⁷ In a later account⁵⁸ of Jack Snipe, Morris included two paragraphs on summer records and declared breeding in the British Isles, but did not itemise Doncaster. Perhaps significantly, under Dunlin, he observed that this species had "been known to build on Thorne Moor, near Doncaster", as Thomas Allis had already written in 1844. Dunlins persisted at Thorne until at least the end of the century.

The list is republished following the sequence and scientific nomenclature of K. H. Vouous (1980) 'List of Recent Holarctic Bird Species' (amended reprint from *Ibis*), with modifications as given in *Ibis* 128: 601-603.

THE SPECIES LIST

Red-throated Diver *Gavia stellata*: Rare.

Great Northern Diver *G. immer*: One was taken alive at Can[n]on Hall (Mr Stanhope's). Also elsewhere.

Little Grebe *Tachybaptus ruficollis*: Common.

Great Crested Grebe *Podiceps cristatus*: Breeds near Hornsea.

Red-necked Grebe *P. griseogenus*: One or two shot near Doncaster every winter.

Slavonian Grebe *P. auritus*: One shot at Barmby-upon-Dun several years ago.

Fulmar *Fulmarus glacialis*: Uncommon.

Sooty Shearwater *Puffinus griseus*: Uncommon. One shot off the Tees mouth by [G.] Marwood, Esq.

Manx Shearwater *P. puffinus*: [no comment].

- Storm Petrel *Hydrobates pelagicus*: Not uncommonly met with.
- Leach's Petrel *Oceanodroma leucorhoa*: One found dead on Sutton Common, near Doncaster. Also elsewhere.
- Gannet *Sula bassana*: Scarborough, Flamborough and one near Doncaster.
- Cormorant *Phalacrocorax carbo*: Scarborough, &c.
- Shag *P. aristotelis*: Scarborough, &c.
- Bittern *Botaurus stellaris*: Not uncommonly met with in some winters. In 1831, Mr Reid, of Doncaster, had twenty-five brought to him.
- Night Heron *Nycticorax nycticorax*: I think I have seen this bird at Woodlands, near Doncaster.
- Great White Egret *Egretta alba*: One shot near Beverley three years ago, now in the collection of James Hall, Esq., of Scorbورو'.
- Grey Heron *Ardea cinerea*: Common.
- Purple Heron *A. purpurea*: One shot near Flamborough, by Mr Pick of that place, in 1833. H. [J.] Torre, Esq.
- White Stork *Ciconia ciconia*: A flock seen fourteen years ago on the Trent. Two supposed to belong to it were shot near Bawtry.
- Spoonbill *Platalea leucorodia*: One shot near Masham.
- Mute Swan *Cygnus olor*: Ponds and lakes.
- Bewick's Swan *C. columbianus*: One shot near Bawtry eight or nine years ago (Mr Reid).
- Whooper Swan *C. cygnus*: Shot near Doncaster, &c. in hard winters.
- White-fronted Goose *Anser albifrons*: Shot near Doncaster in severe weather – sometimes.
- Grey Lag Goose *A. anser*: Common in hard winters.
- Brent Goose *Branta bernicla*: Shot in hard winters.
- Shelduck *Tadorna tadorna*: Has been shot near Doncaster, &c.
- Wigeon *Anas penelope*: Common.
- Gadwall *A. strepera*: Often bought in Doncaster market.
- Teal *A. crecca*: Common.
- Mallard *A. platyrhynchos*: Common.
- Pintail *A. acuta*: Often shot in winter.
- Garganey *A. querquedula*: Frequently shot near Doncaster in the spring.
- Shoveler *A. clypeata*: Sometimes met with near Doncaster in winter.
- Pochard *Aythya ferina*: Common.
- Tufted Duck *A. fuligula*: Often shot near Doncaster and other places in winter.
- Scaup *A. marilis*: Has been shot near Doncaster.
- Harlequin Duck *Histrionicus histrionicus*: Shot by Mr Reid [at Doncaster]. Now in the collection of the Reverend Nathaniel Constantine Strickland, rector of Rington.
- Long-tailed Duck *Clangula hyemalis*: Not very uncommon.
- Common Scoter *Melanitta nigra*: Shot near Doncaster.
- Velvet Scoter *M. fusca*: One shot near Bentley (Doncaster), now in Sir William B. Cooke's collection, Wheatley Hall, near Doncaster.
- Goldeneye *Bucephala clangula*: Not uncommon.
- Smew *Mergus albellus*: Several shot near Doncaster in hard winters.
- Red-breasted Merganser *M. serrator*: Shot near Doncaster in hard winters. Also elsewhere – one in 1837.
- Goosander *M. merganser*: Shot near Doncaster in hard winters.
- Honey Buzzard *Pernis apivorus*: Not unfrequently occurs near Doncaster.
- Red Kite *Milvus milvus*: One caught in a trap in Edlington Wood, and two young taken from the nest sixteen years ago, by Mr Hugh Reid, of Doncaster, he has not heard of one since. It is yearly becoming more rare, particularly in the North Riding.
- White-tailed Eagle *Haliaeetus albicilla*: At Awkley near Doncaster, and Sandbeck.
- Marsh Harrier *Circus aeruginosus*: Not uncommon on the carr grounds near Doncaster.
- Hen Harrier *C. cyaneus*: Not uncommon on the low grounds and carrs near Doncaster.
- Montagu's Harrier *C. pygargus*: Two pairs shot near Doncaster in 1835.
- Goshawk *Accipiter gentilis*: Shot at Cusworth, near Doncaster.
- Sparrowhawk *A. nisus*: Common.
- Buzzard *Buteo buteo*: Plentiful near Doncaster.
- Rough-legged Buzzard *Blagopus*: Often taken on Hatfield Moor, and one at Sutton, near Doncaster.
- Golden Eagle *Aquila chrysaetos*: One shot at Campsall, near Doncaster, about sixteen years ago; one believed to be of this species shot near Newton, in 1838.
- Osprey *Pandion haliaetus*: Rarely taken.
- Kestrel *Falco tinnunculus*: Common.

- Red-footed Falcon *F. vespertinus*: Very rare; a female shot at Rossington, four or five years ago, also a pair near Doncaster.
- Merlin *F. columbarius*: Occurs in the winter near Doncaster.
- Hobby *F. subbuteo*: Breeds in the Woods near Doncaster.
- Gyrfalcon *F. rusticolus*: One lately shot at Sutton-upon-Derwent, near York, in the possession of Mr Allis, vide "The Naturalist" for April 1837.
- Peregrine *F. peregrinus*: Unfrequent. Shot near Doncaster, also shot near Cantley, Scarborough, &c.
- Red Grouse *Lagopus lagopus*: Common.
- Black Grouse *Tetrao tetrix*: Hatfield Moor a few.
- Red-legged Partridge *Alectoris rufa*: Several have been killed near Doncaster.
- Grey Partridge *Perdix perdix*: Common.
- Quail *Coturnix coturnix*: In various parts of the county occasionally.
- Pheasant *Phasianus colchicus*: Common.
- Water Rail *Rallus aquaticus*: Common enough.
- Spotted Crake *Porzana porzana*: Rather scarce.
- Little Crake *P. parva*: One caught at Cantley about twelve years ago.
- Corncrake *Crex crex*: Not uncommon. I have seen it at Wickersley.
- Moorhen *Gallinula chloropus*: Common.
- Coot *Fulica atra*: Common.
- Little Bustard *Otis tarda*: Shot near Beverley, now in the collection of James Hall, Esq.
- Great Bustard *O. tarda*: Killed near North Dalton, also in Mr Hall's collection.
- Oystercatcher *Haematopus ostralegus*: Common on the coast.
- Avocet *Recurvirostra avosetta*: Several have been shot on the Humber. Also on other parts of the coast.
- Stone-curlew *Hurbinus oedicnemus*: Breeds at Rossington and other places near Doncaster.
- Dotterel *Charadrius morinellus*: Often killed on Black Hambleton.
- Golden Plover *Pluvialis apricaria*: Common.
- Grey Plover *P. squatarola*: Common on the coast.
- Lapwing *Vanellus vanellus*: Common.
- Sanderling *Calidris alba*: On the coast.
- Little Stint *C. minuta*: Six killed near Recar, on the River Tees.
- Curlew Sandpiper *C. ferruginea*: Several killed near Hull.
- Purple Sandpiper *C. maritima*: Common enough on the coast.
- Dunlin *C. alpina*: Shot in great numbers by G. Rudd, Esq.
- Ruff *Philomachus pugnax*: Used to be common 20 years ago on Hatfield Moor.
- Jack Snipe *Lymnocryptes minimus*: Breeds near Doncaster sometimes.
- Snipe *Gallinago gallinago*: Also breeds occasionally near Doncaster.
- Great Snipe *G. media*: Two shot near Doncaster. Also killed in other places, but rarely.
- Woodcock *Scolopax rusticola*: Common. Several instances have occurred of their breeding in Yorkshire.
- Black-tailed Godwit *Limosa limosa*: Breeds on the edge of Hatfield Moor.
- Bar-tailed Godwit *L. lapponica*: One killed near Doncaster. Also elsewhere.
- Whimbrel *Numenius phaeopus*: Common.
- Curlew *N. arquata*: Common.
- Redshank *Tringa totanus*: Breeds near Doncaster. Also met with in other parts.
- Greenshank *T. nebularia*: Two killed near Doncaster. Also elsewhere.
- Green Sandpiper *T. ochropus*: Not uncommon.
- Wood Sandpiper *T. glareola*: One shot on the borders of Lincolnshire.
- Common Sandpiper *Actitis hypoleucos*: Common.
- Tumstone *Arenaria interpres*: Often found between Hornsea and Bridlington.
- Grey Phalarope *Phalaropus fulicarius*: A fine specimen in summer plumage, shot at Rossington, in 1836, now (1838) in the possession of Mr Reid, of Doncaster. Near Brignal[1], Scarborough, Crimpsall, &c. &c. Not rarely.
- Pomarine Skua *Stercorarius pomarinus*: Shot occasionally near Scarborough.
- Arctic Skua *S. parasiticus*: Uncommon.
- Little Gull *Larus minutus*: Has been shot near Scarborough I believe.
- Black-headed Gull *L. ridibundus*: Not uncommon on the coast.
- Common Gull *L. canus*: Common on the coast.
- Lesser Black-backed Gull *L. fuscus*: Common on the coast.
- Herring Gull *L. argentatus*: Common on the coast.

- Glaucous Gull *L. hyperboreus*: One shot at Rossington Warren six years ago.
- Great Black-backed Gull *L. marinus*: Common on the coast.
- Kittiwake *Rissa tridactyla*: Common on the coast.
- Roseate Tern *Sterna dougallii*: Shot near Scarborough and Hornsea, by Mr Reid.
- Common Tern *S. hirundo*: Common.
- Guillemot *Uria aalge*: Common.
- Razorbill *Alca torda*: Common at Flamborough.
- Black Guillemot *Cephus grylle*: Used to be not uncommon at Flamborough Head. Mr Strickland has a curious variety.
- Little Auk *Alle alle*: Rare.
- Puffin *Fratercula arctica*: Common at Flamborough.
- Rock Dove *Columba livia*: Common at Flamborough head, where it associates with the Gull[s].
- Woodpigeon *C. palumbus*: Common.
- Turtle Dove *Streptopelia tutur*: Decidedly uncommon.
- Cuckoo *Cuculus canorus*: Common.
- Barn Owl *Tyto alba*: Plentiful.
- Scops Owl *Otus scops*: Met with near Womersley and at Boynton.
- Eagle Owl *Bubo bubo*: One killed off Flamborough Head. Yorkshire, by Patrick Ha[w]kridge.
- Snowy Owl *Nyctea scandiaca*: Shot on a moor near Selby, by the late N. A. Vigors, Esq., M.P., D.C.L.
- Tawny Owl *Strix aluco*: Plentiful.
- Long-eared Owl *Asio otus*: Common near Doncaster.
- Short-eared Owl *A. flammatus*: Common near Doncaster.
- Nightjar *Caprimulgus europaeus*: Not uncommon.
- Swift *Apus apus*: Common.
- Kingfisher *Alcedo atthis*: Common enough.
- Roller *Coracias garrulus*: One shot at Hatfield and one near Halifax, about the same time, seven or eight years ago. One near Scarborough in 1832, now in the Museum.
- Hoopoe *Upupa epops*: Three have been shot near Doncaster, and one seen in 1836, in Sir William Cooke's wood [Wheatley Wood], also at Coatham near Redcar, and near Scarborough.
- Wryneck *Jynx torquilla*: Often met with near Doncaster.
- Green Woodpecker *Picus viridis*: Common.
- Great Spotted Woodpecker *Dendrocopos major*: Not uncommon
- Lesser Spotted Woodpecker *D. minor*: Met with near Doncaster.
- Woodlark *Lullula arborea*: Near Doncaster, &c.
- Skylark *Alauda arvensis*: Common.
- Sand Martin *Riparia riparia*: Common.
- Swallow *Hirundo rustica*: Common.
- House Martin *Delichon urbica*: Common.
- Tree Pipit *Anthus trivialis*: Near Doncaster, &c., common.
- Meadow Pipit *A. pratensis*: Common.
- Rock Pipit *A. petrosus*: Common near Flamborough Head, and elsewhere on the coast.
- Pied Wagtail *Motacilla alba*: Common.
- Waxwing *Bombycilla garrulus*: Six or seven shot, near Doncaster in 1834, and in other hard winters not very unfrequently in other parts.
- Dipper *Cinclus cinclus*: One shot near Doncaster, common in Saltburn beck, &c., &c.
- Wren *Troglodytes troglodytes*: Common.
- Dunnock *Prunella modularis*: Very common.
- Robin *Erythacus rubecula*: Common.
- Nightingale *Luscinia megarhynchos*: Common in Edlington and other woods.
- Redstart *Phoenicurus phoenicurus*: Common in gardens and lanes.
- Whinchat *Saxicola rubetra*: Common.
- Stonechat *S. torquata*: Common.
- Wheatear *Oenanthe oenanthe*
- Ring Ouzel *Turdus torquatus*: Not very uncommon in summer in Woods, in winter in mountainous districts.
- Blackbird *T. merula*: Common.
- Fieldfare *T. pilaris*: Common.
- Song Thrush *T. viscivorus*: Common.
- Redwing *T. iliacus*: Common.

- Mistle Thrush *T. viscivorus*: Common.
- Grasshopper Warbler *Locustella naevia*: Rare.
- Sedge Warbler *Acrocephalus schoenobaenus*: Near Doncaster.
- Lesser Whitethroat *Sylvia curruca*: Rather uncommon.
- Whitethroat *S. communis*: Common.
- Garden Warbler *S. borin*: Common.
- Blackcap *S. atricapilla*: Common in gardens and Shrubberies.
- Wood Warbler *Phylloscopus sibilatrix*: Not uncommon.
- Chiffchaff *P. collybita*: Near Doncaster &c., Common.
- Willow Warbler *P. trochilus*: The commonest of the three "Willow Wrens" in the West Riding of Yorkshire.
- Goldcrest *Regulus regulus*: Common.
- Spotted Flycatcher *Muscicapa striata*: Common in gardens.
- Pied Flycatcher *Ficedula hypoleuca*: Is an annual visitant at Danby, near Middleham, the seat of J. P. Scrope, Esq.
- Long-tailed Tit *Aegithalos caudatus*: Common.
- Marsh Tit *Parus palustris*/Willow Tit *P. montanus*: Common.
- Coal Tit *P. ater*: Common.
- Blue Tit *P. caeruleus*: Common.
- Great Tit *P. major*: Common.
- Nuthatch *Sitta europaea*: Met with near Doncaster.
- Treecreeper *Certhia familiaris*: Near Doncaster, &c.
- Red-backed Shrike *Lanius collurio*: Not very uncommon in some parts of the West Riding.
- Great Grey Shrike *L. excubitor*: Frequently shot near Doncaster in winter, as I am informed by Mr Reid. Also met with in other places.
- Woodchat Shrike *L. senator*: Very rare. Mr [T] Meynel[I], of Kilvington, informs me that it has occurred. Mr Le[al]dbitter has a Yorkshire specimen.
- Jay *Garrulus glandarius*: Common.
- Magpie *Pica pica*: Common.
- Chough *Pyrrhocorax pyrrhocorax*: One shot near Sheffield, which was preserved by Mr Hugh Reid, of Doncaster.
- Jackdaw *Corvus monedula*: Common.
- Rook *C. frugilegus*: Common.
- Carriion Crow *C. corone*: Common near Doncaster, &c.
- Hooded Crow: Common on low grounds, moors, &c.
- Raven *C. corax*: About five and twenty years ago used to be very common, but has since been gradually getting scarce in most parts; not very common near Flamborough – H. J. Torre, Esq.
- Starling *Sturnus vulgaris*: Common.
- Rose-coloured Starling *S. roseus*: Shot at Thorne three years ago, also at Skinningrove, &c.
- House Sparrow *Passer domesticus*: Common.
- Tree Sparrow *P. montanus*: Met with near Doncaster.
- Chaffinch *Fringilla coelebs*: Very common.
- Brambling *F. montifringilla*: Met with near Doncaster.
- Greenfinch *Carduelis chloris*: Common.
- Goldfinch *C. carduelis*: Common.
- Siskin *C. spinus*: Not very uncommonly met with. A large flock seen in Sandall Beat, April 1837.
- Linnet *C. cannabina*: Common.
- Twite *C. flavirostris*: near Doncaster, &c.
- Redpoll *C. flammea*: Common near Doncaster.
- Crossbill *Loxia curvirostra*: Common. Periodically in fir plantations near Doncaster and other places.
- Bullfinch *Pyrrhula pyrrhula*: Common.
- Hawfinch *Coccothraustes coccothraustes*: Generally rare. But in some seasons common enough near Doncaster, two shot near Orm[e]lsby, by Mr Thompson.
- Snow Bunting *Plectrophenax nivalis*: Occurs near Doncaster.
- Yellowhammer *Emberiza citrinella*: Common.
- Cirl Bunting *E. cirlus*: Killed near Campsall Hall, 1837.
- Reed Bunting *E. schoeniclus*: Near Doncaster, &c.
- Corn Bunting *Miliaria calandra*: Common.

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BOOK REVIEWS

Martin Lister's English Spiders (1678): translated by **Malcolm Davies and Basil Harley**, edited with an Introduction and Notes by **John Parker**. Pp. 192 with one colour plate and several b/w illustrations. Harley Books (Martins, Great Horkestone Colchester CO6 4AH) 1992. H/B £49.95, P/B £24.95 plus £2.50 p. & p. per copy.

Martin Lister's remarkable book, *Tractus de Araneis*, was written in Latin over three hundred years ago and is the earliest known scientific work in the world devoted solely to spiders. Now at last we have an English translation. Martin Lister spent most of his early life in the Craven district of Yorkshire, and by the time he took up medical practice in York he was a naturalist of national repute, specialising in botany, conchology and arachnology. John Parker's introduction chronicles Lister's life, including that which led to his appointment as physician to the king, and assesses his contribution to arachnology.

This very readable translation of Lister's *Tractatus* comprises an introductory section on the diversity of spiders; their reproduction; the nature of thread and the manner of its production; the manner of shedding the skin; the diet of spiders and their methods of hunting; wasps and other enemies; several beliefs handed down from the Ancients and writers of the Middle Ages – some doubtful, some spurious – and medicaments from spiders. In Book 2 Lister describes over 30 species of spider known to him; in each case, he provides a description, details of habitat, nature of the web, a brief life-history with details of eggs and egg-sac, and finally a commentary by John Parker on Lister's observations in the light of modern knowledge. The latter part of the book deals with Lister's correspondence with John Ray and other Fellows of the Royal Society, of which Lister was Vice-President for a number of years.

This is a delightful book, combining a very scientific yet almost Fabre-like introduction to the study of spiders with a fascinating insight into the revolutionary developments in scientific knowledge that were taking place in the 17th century. It should appeal to a wide range of natural historians and, at last, brings Lister the recognition he so richly deserves.

CJS

British Red Data Books. 3 Invertebrates other than Insects edited by **J. H. Bratton**. Pp. 253 + 20 monochrome plates. Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, PE1 1JY. £8.00 (post free).

A more than welcome companion to volumes 1 and 2. It highlights the importance of the non-insect invertebrate fauna of Britain by identifying those species whose existence may be threatened in some way or another; the thoughtful introduction of an Insufficiently Known category focuses attention on those species which could benefit from more detailed attention. The bulk of the book consists of data sheets, each dealing with one species along with notes on available information, taxonomy, identification, distribution, habitat, ecology, status and conservation. There are plates depicting various habitats and an excellent cross-referenced species – place name index.

Somewhat specialist in its application but absolutely invaluable to those involved with biological recording, county trusts, nature trust management and serious students of invertebrates. It is excellent value for money.

DTR

LOSS OF AQUATIC VEGETATION IN A WOLDS WINTERBOURNE DURING PERENNIAL DRYNESS

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The adverse ecological effects of recent low flows in the chalk streams of S and E England, brought about by reduced rainfall and increased abstraction from aquifers, are a current cause of concern (Giles *et al.* 1991). The characteristic plants of healthy chalk streams are species of water crowfoot, often *Ranunculus penicillatus* var. *calcareus* (Westlake *et al.* 1972; Haslam 1978) which in spring and summer may occupy virtually the whole channel. In late summer, following decrease in current velocity and silt deposition, species which are less demanding of fast-flowing water may increase in importance, e.g. water-cress, *Nasturtium officinale* (Ladle & Casey 1971). *Ranunculus* also decreases further upstream (Haslam 1978) and may be replaced by, for example, *N. officinale* and fool's watercress, *Apium nodiflorum*, the latter possibly being more tolerant of drier conditions (Thommen & Westlake 1981). This upstream change in vegetation is related to decrease in discharge, and particularly to intermittent flow, dry stream beds being a feature of many calcareous headstreams during late summer-autumn. Such intermittent streams are known as winterbournes.

Recent low flows have resulted in hitherto permanent chalk streams becoming intermittent. *Ranunculus* (water crowfoot) has often been replaced by plants, notably *N. officinale*, associated with silted and upstream situations. Growth of blanket weed (filamentous algae) has occurred, and plants which are usually found as emergents in the margin, e.g. bur-reeds, *Sparganium* spp., have come to choke channels (Giles *et al.* 1991).

A further feature of reduced flows is that lengths of headstream which customarily have intermittent flow are liable to become perennially dry. The fate of such streams is less well documented. The purpose of this paper is to describe the response of vegetation to permanent dryness in Mill Beck, a calcareous stream near Market Weighton, N Humberside, which has hitherto been intermittent.

Mill Beck is spring fed from beneath the western scarp of the Upper Cretaceous chalk of the Yorkshire Wolds. The principal source, at National Grid Reference SE 899 426, is a brickwork culvert which emerges from beneath a long-disused railway line. Natural springs were presumably channelled into this culvert during railway construction which was completed by 1865. Water for public supply is pumped from a borehole about 100 m south of the source.

Planktonic bacteria in the stream were studied from March 1981 to March 1982 (Goulder 1984) and incidental observations were made on vegetation. In March 1981, there was already flow from the source which continued until September, with a maximum in April. Flow resumed from January to March 1982 and beyond. The stream, for about 500 m downstream of its source, flowed largely through unshaded damp pasture. For most of 1981 there was abundant aquatic vegetation, predominantly *N. officinale* and *A. nodiflorum*, which occupied 75-100% of the stream width. In December 1981, hard frosts occurred before the resumption of winter flow, hence the unprotected vegetation was severely damaged, and vegetation cover in January-March 1982 was much less than in the previous year.

Further studies on aquatic plants in the stream, and their epiphytic bacteria, were carried out during May-June 1983 (Rimes & Goulder 1986) and during January-June 1984 (Rimes & Goulder 1987).

The May-June 1983 study was on the length of stream from 0-48 m downstream of the source. Flow from the source during May-June, at $0.42-0.62 \times 10^4 \text{ m}^3/\text{day}$, was substantial. The area of submerged stream bed, between 0 m and 48 m, was 312 m^2 . Dense aquatic

vegetation occupied 306 m² of this, comprising 226 m² of emergent vegetation and 80 m² of submerged vegetation. The mean dry weight, of underwater shoots only, from harvesting of 54 randomly-placed quadrats (25 cm x 25 cm) was 288 g/m². The principal species were *N. officinale* (on average representing 50% of total underwater dry weight), water-speedwell, *Veronica anagallis-aquatica*, (25%), and *A. nodiflorum* (9%). Total dry weight of underwater leaves and stems, in the 0.48 m length of stream, was about 89 kg.

The January-June 1984 study was on a 135 m length of stream extending from about 225 m to 360 m downstream of the source. When the study began in late January, there was already a substantial flow through this length of stream of about 1.5×10^4 m³/day. This rapidly increased to a peak of about 3.2×10^4 m³/day in mid February, and then decreased steadily to about 0.41×10^4 m³/day in late June. Aquatic vegetation was abundant, covering 89-96% of the stream bed. The area occupied by emergent foliage increased from 2% in February to 87% in June. Early in the year the submerged foliage was protected from frost by the near-constant spring-water temperature of around 10°C. The mean dry weight, of underwater shoots only, increased from a January minimum of 109 g/m² to a May-June plateau with a maximum of 249 g/m². These data are based on harvesting of 18 randomly-placed 25 cm x 25 cm quadrats on each of eight sampling days. The maximum total dry weight reached by underwater leaves and stems in the entire 135 m length of stream, area 640 m², was about 150 kg. The principal species present were *N. officinale*, *A. nodiflorum*, and flote-grass, *Glyceria fluitans*, which by late June together made up 86% of total underwater dry weight.

In contrast to the early 1980s, flow from the Mill Beck source has been irregular in recent years. I am grateful for information on flows to Gordon Scaife, warden of Rifle Butts Quarry, a Yorkshire Wildlife Trust reserve which is adjacent to Mill Beck. The source flowed in 1989 from February to July, in 1990 from February to May, and in 1991 during March-April and briefly in June. This year (1992) there has to date (August) been no flow.

Observations on vegetation in the dry stream bed were made during May, July and August 1992. The first 50 m downstream of the source formed a dry grassy sward with the grasses *Agrostis stolonifera* and *Holcus lanatus* being abundant. Seven out of 13 aquatic plants present in 1983 were not found in 1992 (Table 1). The lost species included *N. officinale* and *A. nodiflorum* which had dominated the vegetation here during the 1981 and 1983 studies. Figure 1 contrasts the 1983 vegetation with that in 1992. The surviving hydrophytes (Table 1) were species which often grow as emergent plants at stream margins. Most notable were reed sweet-grass, *Glyceria maxima*, yellow flag, *Iris pseudacorus*, and water mint, *Mentha aquatica*, which formed appreciable stands, although probably, in total, not occupying more than about 15% of the dry stream bed.

The length of stream bed, 225-360 m downstream of the source, was also dry during May-August 1992. Most of the bed was occupied by an ungrazed grassy sward; there were also extensive areas of thistles, mainly *Cirsium arvense*, and some cover of stinging nettles, *Urtica dioica*. Five out of 12 aquatic species present in 1984 were not found in 1992 (Table 1). *Nasturtium officinale* and *A. nodiflorum*, which were hugely abundant in 1984, were largely restricted, along with lesser water-parsnip, *Berula erecta*, and brooklime, *Veronica beccabunga*, to a few plants towards the upstream end of the section. This area, which was shaded by trees on the adjacent disused railway embankment, was probably somewhat damper.

The vegetation changes reported here are important in the context of biological conservation. The lost vegetation represented a good example of a type which is characteristic of intermittent calcareous streams: a luxuriant stand of aquatic plants with a preponderance of amphibious species, able to withstand limited spells of dryness, most notably *N. officinale* and *A. nodiflorum*. This vegetation type is not widespread in its distribution around the Yorkshire Wolds. Small watercourses suffer from over-zealous land-drainage engineering work and from fish-pond construction. An especially severe inhibitor, however, is shading by riparian trees and shrubs.



FIGURE 1

The view upstream to the source of Mill Beck. (Top) May 1983 with high water flow and abundant freshwater macrophytes, largely *Nasturtium officinale*, *Veronica anagallis-aquatica* and *Apium nodiflorum*. (Bottom) May 1992, the stream bed is a dry grassy sward.

TABLE 1
Aquatic plants recorded near to the source of Mill Beck, 1983-84 and 1992

Species*	Distance from source			
	0-50 m		225-360 m	
	May-June 1983	May-August 1992	January-June 1984	May-August 1992
<i>Agrostis stolonifera</i>	+	+	+	+
<i>Apium nodiflorum</i>	+	-	+	+
<i>Berula erecta</i>	+	-	+	+
<i>Caltha palustris</i>	+	+	+	+
<i>Equisetum fluviatile</i>	-	-	+	-
<i>Glyceria fluitans</i>	+	-	+	-
<i>Glyceria maxima</i>	+	+	-	-
<i>Iris pseudacorus</i>	+	+	-	-
<i>Mentha aquatica</i>	+	+	-	-
<i>Myosotis scorpioides</i>	+	+	+	+
<i>Nasturtium officinale</i>	+	-	+	+
<i>Ranunculus aquatilis</i>	-	-	+	-
<i>Ranunculus flammula</i>	+	-	+	-
<i>Veronica anagallis-aquatica</i>	+	-	+	-
<i>Veronica beccabunga</i>	+	-	+	+

* Only species listed by Palmer and Newbold (1983) as aquatic plants found in England and Wales are included here. Nomenclature here, and elsewhere in this paper, follows Clapham, Tutin and Moore (1987). (+) Indicates present, (-) indicates not found. The 1983-84 records are from Rimes and Goulder (1986, 1987) and from contemporary notebooks

Prediction about the future of the Mill Beck vegetation is speculative. Changes in rainfall and/or abstraction might restore regular water flow, in which case there might be rapid regeneration from the seed bank in the stream bed. Grazing pressure in the upstream pastures, however, is now much less than it was in the early 1980s, hence management to control excessive shading might be needed. On the other hand, if water flow and grazing are not restored, further growth of the seedlings of hawthorn, *Crataegus monogyna*, and dog rose, *Rosa canina*, which now thrive in the stream bed close to the source, might lead to development of shrub cover and to total loss of aquatic vegetation.

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NOTES ON YORKSHIRE MOLLUSCA – NUMBER 9

LIMAX (LIMACUS) MACULATUS (KALENICZENKO, 1851), A SLUG NEW TO YORKSHIRE

A. NORRIS

Leeds City Museums

On Saturday 4th April 1992, a single specimen of *Limax (Limacus) maculatus* (Kaleniczenko, 1851) was found under a slab of stone in the centre of the village of Arncliffe, Littondale (SD34/933718), by the author. Several members of the Yorkshire Conchological Society who had spent the day recording in the area searched for further specimens but none could be found. A search of the area at night would probably be more profitable, and further examples should come to light.

L. maculatus is native to the areas surrounding the Black Sea and was first noticed in the British Isles on field trips by members of the Conchological Society of Great Britain and Ireland in the late 1960s. At first it was thought to be a species new to science and was described and named by N. J. Evans (1978) as *Limax pseudoflavus*. It is known by that name in most recent publications. Wiktor and Norris (1982) compared material from the Crimea, the Caucasus, Turkey and Bulgaria and were able to demonstrate that *L. pseudoflavus* was a synonym of *L. maculatus*.

The earliest record of this species in the British Isles dates back to October 6, 1884, when Charles Ashford (1829-1894) found six specimens of '*L. flavus*' in Christchurch, Hampshire. These specimens were dissected and Charles Ashford made careful pencil drawings which are now preserved in the British Museum (Natural History) as part of the manuscript notebooks compiled by J. W. Taylor and W. Dennison Roebuck for Taylor's Monograph (Kennerly, 1986).

Even though it reached Britain in the last century, the spread of this species in the British Isles is thought to be a recent occurrence. The slug is common and widespread in woodland habitats in Ireland, being found under the bark of trees in wild situations. In recent years, it has been recorded from the mainland in scattered locations from Dover in the south through mid-Wales, Liverpool and Carlisle, to Berwick-on-Tweed in the north. In

mainland Britain it has usually been found in situations similar to that of the common yellow slug, *Limax flavus* Linnaeus, 1758, a synanthropic species normally found in close proximity to human occupation.

The occurrence of this species in Yorkshire was predicted, and it may soon become as common in Britain as it now is in Ireland. Care should be taken when recording both of the yellow slugs *L. flavus* and *L. maculatus*, as they can be very difficult to separate without careful dissection. *L. maculatus* is a darker pale greenish-gray to olive-green ground colour, overlaid with darker mottling, whilst *L. flavus* is paler yellow overlaid with pale greyish mottling.

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BOOK REVIEWS

British Plant Communities. Volume 2. Mires and Heaths edited by J. S. Rodwell. Pp. 628, 28 figures plus maps. Cambridge University Press 1991. £95.00 hardback.

This book is the second in a four-part series which attempts to review and classify British plant communities. The authors and the many researchers who voluntarily submitted their own floristic data on mires and heaths have to be congratulated on this herculean task of incorporating and analysing over 5,300 relevés from mires and heaths all over Britain. Unfortunately Irish material is excluded from the whole of the National Vegetation Classification (NVC) scheme of which this book is a product.

The book follows the same format as that in the first volume on woodlands (see review in *Naturalist* **116**:44), except it incorporates mires and heaths as two separate sections within the one volume. The beginning of both the mire and heath sections gives an overview of the relationships between each main community in geographical, successional, climatological, nutritional and topographic terms. There are 38 mire communities described together with their appropriate subdivisions, floristic table and distribution map based on the relevés from which each one is derived. The 22 heath communities are treated in the same way.

The key to the different mire and heath communities may appear to help a fieldworker in assigning an area of vegetation to a particular community, but in my experience it only works satisfactorily in the minority of cases. Some of the rather strange phytosociological groups are partly a result of amalgamating several different ecologists' work with the inherent lack of comparability in field methods. Also the subsequent multivariate statistical analysis to group relevés is not without its drawbacks. For example the *Molinia caerulea-Potentilla erecta* mire (M25) is a large and variable community which is described as a transition community to blanket mire or rush-pasture or tall-herb fen. This suggests that this community is a "catch-all" community for those relevés that do not fall into other communities.

This book is for the professional or very enthusiastic amateur ecologist who is fully conversant with the principles of phytosociology. The price will however make anyone wince.

ADH

DEER (CERVIDAE) DROWNING IN CANALS

C. A. HOWES

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INTRODUCTION

The progressive southerly spread of roe deer *Capreolus capreolus* across the Yorkshire and North Humberside region since the 1930s is reviewed by Howes (1977) and Mitchell (1985). Since the late 1960s and particularly during the 1980s, roe deer populations in the lower Vale of York and the Humber Head area have increased to the extent that most suitable woods, copses and scrub areas are either occupied or visited; during winter periods when agonistic behaviour in this normally territorial species is relaxed, groups of up to eight individuals are not infrequently seen, particularly in the vicinities of Thorne and Hatfield moors (SE/61; 71).

Symptomatic of an increase in population density within this region have been occasional appearances in suburban gardens, road casualties and frequent incidents of deer becoming trapped and often drowning in canals; indeed, the drowning of a roe doe in the Stainforth-Keadby canal at Stainforth on 1st January 1977 (Howes 1977) provided one of South Yorkshire's first tangible records of this now widespread species.

CANAL DESIGN AND DEER DROWNINGS

In 1990, discussions with bargees and other canal craft employees, anglers, naturalists and animal welfare workers revealed that up to 16 deer annually were being rescued or found drowned in the busy commercial waterways in the region centred on the Doncaster, Thorne, Crowle and Goole, districts. Incidents were occurring most frequently in the lower Aire/Calder navigation from Rawcliffe Bridge to Goole Docks, the Stainforth to Keadby section of the South Yorkshire Navigation and the interlinking New Junction Canal from Kirk Bramwith to Sykehouse (Howes 1990).

With the exception of the New Junction Canal, situated in a thickly hedged terrain of small pastures and green lanes, these canal systems largely pass through a landscape characterised by intensive arable agriculture. Thus the linear zones of tall herb, scrub and woodland which have developed along the canal corridors provide some of the most undisturbed cover and feeding areas available to these large and mobile animals.

Under normal circumstances, roe deer could easily swim across the still or slow moving water of a 20 to 30 metre wide canal in order to reach suitable cover, new food resources or to flee from disturbance. Significantly perhaps, there have been no reported fatalities from the numerous major river systems (Went, Don, Torne and Idle) which pass through the region, or from the network of water courses which drain the Hatfield Chase. One must assume therefore that these obstacles are crossed without difficulty; indeed, well worn tracks in waterside vegetation give evidence of the ability to climb ashore.

By contrast, the metal or concrete piling along the banks of major industrial navigations, required to prevent bank erosion by the wash from frequent and fast moving commercial traffic, is proving too high to allow the deer to scramble ashore. Water bodies of this design effectively function as linear pitfall traps from which deer and other large mammals are unable to escape.

To investigate whether the problem is as widespread for deer as it evidently is for waterside grazing farm animals (mainly cattle and ponies), appeals for information were made in a range of national waterways, wildlife and countryside magazines. Information was also sought from members of the Mammal Society, Ungulate Research Group, British Deer Society, Yorkshire Mammal Group and the Yorkshire Wildlife Trust.

The results, presented in Appendix 1, show the problem to be almost exclusively confined to the network of navigable waters in the Humber Head region as described

above, where to July 1992 at least 60 drownings or rescues have been reported. Other Yorkshire/Humber side examples are one from Knottingley Lock, again on the Aire/Calder Navigation and one in Hull Docks.

The only records received from outside this region were both from the Grand Union Canal system, where a small unidentified deer was seen on 25th May 1991 in waterside vegetation at West Drayton (TQ/0679) (D. A. Campbell *pers. comm.*) and a male muntjac (*Muntiacus reevesi*) found drowned on 3rd October 1991 near Warwick (SP/2766) (P. Chanin *pers. comm.*).

The problem of large mammals becoming trapped in navigable watercourses is well known in Europe, the matter being reviewed and solutions proposed in Leirop (1986) and Bekker (1990), and in Arizona, USA, the problem of mule deer (*Odocoileus hemionus*) becoming trapped in canals has been studied by Krausman (1990).

Whereas the erection of electric fences or the revocation of waterside grazing leases has succeeded in reducing the incidence of farm animals getting into difficulties along dangerous stretches of canal bank (T. Price *pers. comm.*), these options are inappropriate for free ranging animals.

Resulting from the assembly and analysis of the records in this study the creation of appropriately designed and strategically positioned stepping out points is under investigation by engineers at British Waterways.

AGONISTIC BEHAVIOUR IN ROE AND SEASONALITY OF DROWNINGS – A POSSIBLE LINK

Since drowning incidents have occurred during all seasons, it was assumed that disturbance by shooting, dogs or general human activities along canal banks and on adjacent land were the primary causes of deer being flushed from cover and forced to make their escape across water; indeed, shooting was implicated in one fatality.

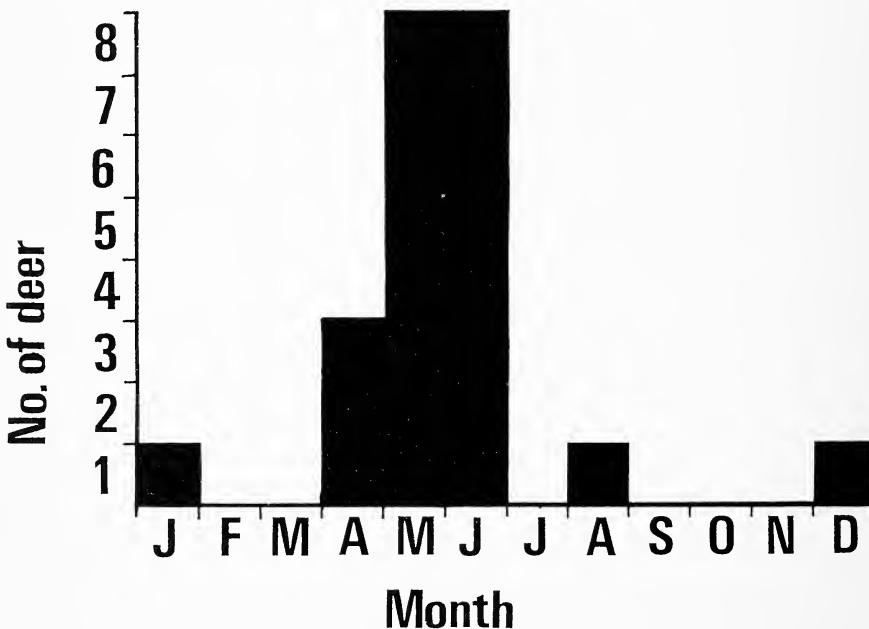


FIGURE 1

Seasonality of deer becoming trapped in canals (records referable to specific months only)

An analysis of seasonality does not however accord with predicted peaks of human activity on canal banks, during holiday periods or the coarse fishing season. Of the 22 records where a precise date or month is given, 19 refer to the April to June period (see Figure 1) and of the 24 records relating to more than one month or season at least 19 (and perhaps all) refer to the spring and early summer period (up to June). This strongly suggests a link with the annual dispersal of young and low status animals.

Dominant bucks, usually older individuals, actively defend territory from April to August. Aggression between adjacent territorial bucks is most intensive during the early period of territory formation. However, bucks without territories, mostly young animals, are chivvied and harassed by territory holding bucks throughout the spring and early summer (Bramley 1970, Chaplin 1977). Increased agonistic behaviour by pregnant does shortly before giving birth (mainly from mid May to mid June) serves to drive away the previous year's fawns (Bramley 1970, Chaplin 1977). These overlapping behaviour patterns serve to promote dispersal in low status bucks and young of both sexes during the period which coincides with high levels of drownings.

Since topographic features such as woodland rides and streams frequently appear to act as territorial boundaries (Chapman 1977), it is reasonable to assume that canal banks or scent marked shrubs along canal banks also function in this way, with territory holding animals effectively forcing lower status animals into the water and thus into difficulties.

SUMMARY

An evident increase in the roe deer population density in the southern Vale of York and the Humber Head region, particularly since the late 1970s, has been accompanied by an increase in cases of deer (mainly roe) becoming trapped in major industrial navigations of the Doncaster, Thorne, Crowle and Goole areas, where at least 60 animals in total and up to 16 per year have been reported drowned or rescued. Appeals through national waterways, wildlife and countryside magazines have produced little additional information, suggesting the problem to be currently confined to the above area. Although cases have occurred during every season, the majority of datable instances are confined to the April-June period, thus raising the speculation that seasonal territorial and agonistic behaviour leading to the dispersal of low status males and young animals may be a significant cause of deer being forced to cross water barriers. Since there have been no reported cases of deer getting into difficulties in the river or drain systems of the region, it is assumed that those canal embankments lined with erosion resistant concrete or metal piling are proving too high to enable deer to escape. The creation of strategically positioned stepping out points is currently under investigation.

ACKNOWLEDGEMENTS

I would like to thank Chris Duthridge and Peter Hinks for the majority of records and who provided useful contacts with British Waterways employees. Thanks are also due to the editors of *Waterways World*, *Waterways*, *Natural World* and *The Field and Shooting Times* for allowing me to canvass nationally for information. Records were also provided by Inspector Tony Price of the South Yorkshire RSPCA, D. A. Campbell, Dr. P. Chanin, A. Elks, M. Hanson, C. Lambourne, J. Pickering and M. Todd. Norma Chapman of the Mammal Society suggested the preparation of this paper and provided valuable background information.

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APPENDIX 1
Records of Deer Becoming Trapped in Navigable Waters
Within the Yorkshire/Humberside Region
(Arranged by Canal)

Date/Period	DRO	RES	Locality & Grid Ref.	Source
(Aire/Calder Navigation)				
15/4/79	1*+	-	Rawcliff Bridge (SE/7021)	(Dunc. Mus.)
Spr/early sum '89	4-5	4	Rawcliff Bridge to Goole (SE/72)	(Howes 1990)
Spring '90	1	-	Knottingley Lock (SE/51)	(Howes 1990)
Up to -/6/90	5-7	-	Pollington to Goole (SE/61; 62; 72)	(Howes 1990)
2/6/90	1f+		Nr. Goole (SE/72)	(Howes 1990)
6/6/90	1		Nr. Goole (SE/72)	(Howes 1990)
Early 4 to mid 5/91	2	3	Aire/Calder (SE/62; 72)	(P. Hinks)
End of 5/91	2		Aire/Calder (SE/62; 72)	(P. Hinks)
Week ending 9/6/91	-	1	Goole Docks (SE/7322) rescue by Fire Brigade	(P. Hinks)
14/6/91	1	-	Nr. Rawcliffe Bridge (SE/62; 72)	(P. Hinks)
30/6/91	1	-	Nr. Rawcliffe Bridge (SE/62; 72)	(P. Hinks)
Mid 8/91	-	1	Nr. Rawcliffe Bridge (SE/62; 72)	(P. Hinks)
Early 12/91	1	-	Nr. Rawcliffe Bridge (SE/62; 72)	(P. Hinks)
6/5/92	2m	-	Goole Docks (SE/7322)	(P. Hinks)
29/5/92	-	1m	Nr. Rawcliffe Bridge (SE/62; 72)	(P. Hinks)
18/5/92	1m	-	Goole Docks (SE/7322)	(P. Hinks)
8/6/92	-	1	Goole Docks (SE/7322)	(P. Hinks)
(New Junction Canal)				
-/-85	-	1	Northern end (SE/6418)	(Dunc. Temp. Lock Keeper 1991)
25/6/90	1	-	300 yds below Sykehouse Bridge (SE/6417)	(M. Hanson)
Up to 13/9/90	5	-	New Junction Canal (SE/61)	(Howes 1990)
24/5/91	1	-	New Junction Canal (SE/61)	(P. Hinks)
(Stainforth/Keadby Canal [South Yorkshire Navigation])				
1/1/77	1f+	-	Stainforth (SE/6512)	(Howes 1977)

Date/Period	DRO	RES	Locality & Grid Ref.	Source
2/5/88	-	1	1/2 mile above Thorne Lock (SE/6713)	(C. Lambourne)
14-17/4/91	1	-	Stainforth (SE/6512)	(A. Elks)
22/4/91	1	-	Stainforth (SE/6512)	(A. Elks)
General			Crowle to Keadby (SE/71;72) deer frequently in canal	(Donc. Temp. Lock Keeper 1991)
General			Crowle/Ealand area (SE/71;72). Deer, cattle and ponies frequently rescued by Fire Services and R.S.P.C.A. officers	(Inspector Tony Price South York- shire RSPCA 1991)
1991-2	7	8	Maud's Bridge area (SE/7012) 15 removed by M. Todd	(Howden, Goole & Thorne Courier 28/5/92)
(Hull Docks)				
11/6/89	-	1m	William Wright Dock (TA/1428)	(Hull Daily Mail 12/6/89)

DRO = Drowned

RES = Rescued or swimming

* = Fallow deer

+ = Spn. in Doncaster Museum colln.

m = Male

f = Female

BOOK REVIEW

Classification and Ranking of Water Beetle Communities by G. N. Foster and M. D. Eyre. UK Nature Conservation No. 1. The Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough.

Naturalists individually develop a personal categorisation of ponds, lakes, streams, rivers etc. based on their own collecting experience and taking into account such reports as they encounter in literature and by contact with other entomologists. A good pond has a larger than average number of species and these include a larger than average proportion of uncommon ones. It is all very personal and subjective.

More objective methods of ranking sites can be employed with the aid of computers and this study, which covers seven selected regions but does not include Yorkshire, uses Fortran programmes Decorana and Twinspan to do just this. It still requires, of course, the basic searching, collecting, naming and ranking of species but for those with access to appropriate computers and software this refinement of our methods is available now and for the rest of us is the possible shape of things to come.

JHF

PROGRESS IN THE STUDY OF THE YORKSHIRE LICHEN FLORA

M. R. D. SEAWARD

Lichenological activity in Yorkshire continues unabated, and it is pleasing to report a significant increase in lichen recording since the publication of the previous progress map based on November 1988 data (*Naturalist* 116: 31-33). Since that time, considerable fieldwork has been undertaken in the county, particularly by B. J. Coppins, P. M. Earland-Bennett, A. Fryday, O. L. Gilbert, A. Henderson, C. J. B. Hitch, D. H. Smith and M. R. D. Seaward.

Since 1960, more than 17540 grid square records have been gathered and their average number per square has risen from c. 77 in November 1988 to c. 90 in November 1992 (which is significantly higher than the current national figure of c. 85); these data represent a 16.9% increase in recording over the past four years.

Provisional maps for all taxa have already been prepared; it is envisaged that their publication in the not too distant future will form the first stage in the compilation of a county lichen flora.

By November 1992, the Yorkshire lichen flora can be summarized as follows:

833 taxa (809 species, 8 subspecies, 12 varieties and 4 forms) have been recorded from the county over the past 300 years, of which 226 (220 species, 4 subspecies and 2 varieties) are based on old records, most of which can be presumed extinct since they have not been seen for over a century; of the 607 extant taxa (c. 37% of the British flora), c. 213 have been discovered during the past 32 years.

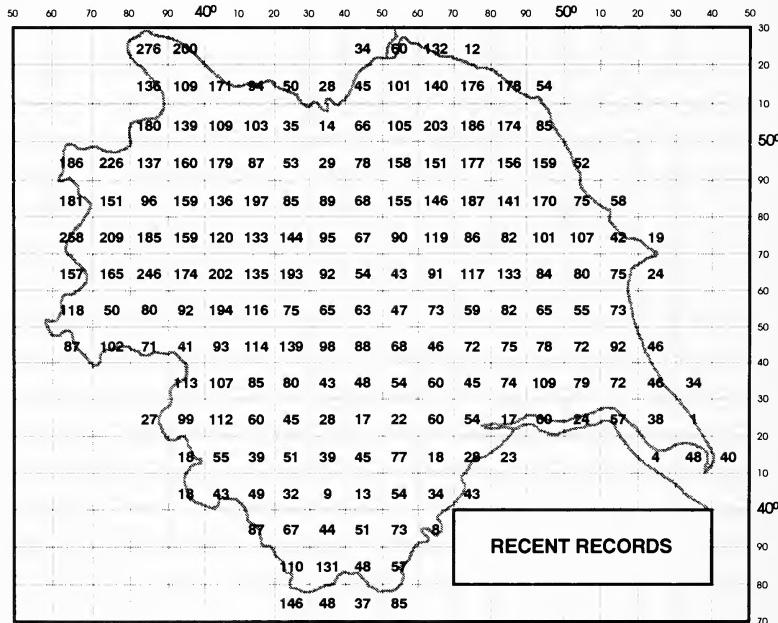


FIGURE 1

Number of extant lichen taxa, based on post-1980 records, in each Yorkshire 10 km x 10 km grid square (November 1992). Border squares may contain a few records pertaining to the neighbouring county. Computer derived map prepared by S. Davidson.

OBITUARIES**BRIAN SHAW PASHBY**
(1917-1991)

Brian Pashby, President of the Yorkshire Naturalist's Union for 1991, died of a heart attack on 17th November, 1991, at the age of 74 years. Typically, despite dying in office, he and his wife Shirley attended all the major YNU field meetings held during his Presidential year – an achievement probably unprecedented in the history of the Union Presidency. Almost completed at the time of his death, Brian's Presidential Address – a history of the Humber Wildfowl Refuge – was provided with a summary and delivered on his behalf by his friend and colleague of many years, Derek B. Cutts, at the 1991 YNU Annual General Meeting, held in Beverley on 7th December, 1991. His funeral, held at Scarborough, was attended by four previous Presidents of the YNU, by representatives of the Wildfowl and Wetlands Trust and of English Nature (formerly The Nature Conservancy Council), as well as by representatives and/or members of the many organisations with which Brian was associated during his lifetime, including the Yorkshire Wildlife Trust, the Wild Flower Society, the Hull Natural History Society, the Scarborough Field Naturalists' Society, and several sections and committees of the YNU.

A Hull man born and bred, and a keen supporter of Yorkshire County cricket and of Hull and East Riding Rugby football during his younger days, Brian was for many years Steward of the Brynmor Jones Library of Hull University prior to his retirement and subsequent move to Hunmanby with his second wife, Shirley, in 1981.

Seemingly only becoming seriously interested in natural history (and certainly only coming to the attention of his contemporaries) in his mid-thirties, but nevertheless displaying from the outset his typical determination to become actively involved with the work of any organisation he became associated with, he was elected a member of the

Yorkshire Naturalists' Union at the Union's Annual General Meeting held in Huddersfield on 3rd December, 1955, during the Presidency of the late Dr. E. W. Taylor. Brian's sponsors were no lesser personages than Ralph Chislett and G. R. Ainsworth, then Chairman and Hon. Secretary respectively of the Spurn Bird Observatory committee, and leading ornithologists of their day.

With his first wife, Gladys, who later died, Brian also became a member of the then Hull Scientific and Field Naturalists' Club, since renamed the Hull Natural History Society, in April 1956, immediately becoming its long-serving Ornithological Recorder and, subsequently, its Hon. Secretary (1958-69), its Vertebrate Section Leader (1960-62), its Vice-President (1969-72 and 1980-82) and its President from 1972-75. He was also subsequently a member of its Council from 1983-85. During his many years of service he was closely involved with all aspects of the Society's work and activities, including the organisation of indoor and field meetings, its publications (including some pursued in association with outside bodies such as the Hull and East Riding Field Studies Association and Hull Geological Society), and represented the Society on bodies such as the East Yorkshire Conservation Council. Never was any local society more loyally served!

By inclination and experience primarily an ornithologist, always describing himself as 'an estuary man', and from the outset a keen student of the bird life of the Humber estuary, it was hardly surprising that, in 1960, Brian was appointed the YNU's representative on the Humber Wildfowl Refuge committee, a service he performed for the Union until his retirement from the committee in 1990. In addition to representing the YNU, he subsequently became the committee's Hon. Secretary from 1969-1983, prior to which, and subsequently, acting as its Permit Officer and, after relinquishing the Secretaryship becoming the committee's Hon. Treasurer. His extensive knowledge and great commitment over his 30 years of service were invaluable to the work of this committee.

Equally surprisingly, having by then become a regular visitor to the reserve, Brian was asked (more or less instructed by Ralph Chislett!) in July 1962 to become a member of the Spurn Bird Observatory committee, and remained a member of it until he died (he attended his last meeting the day before his death). During his 30 years of service to this committee he served as its Hon. Secretary (and its representative on the YNU Executive and Ornithological Section's General committees) from 1972-78, catalogued its book collection, and published a number of works related to the reserve and to the estuary, including notes and papers on Earth Star fungi at Spurn, The Fulmar Wreck of 1962 (with John Cudworth), Pink Footed Goose fatalities at the Humber Refuge, Brent Geese and *Zostera* at Spurn, the Oystercatcher in the Humber area and two major works published by the Spurn Bird Observatory Committee, *John Cordeaux, Ornithologist* (an in-depth study of the work of the great 19th century Lincolnshire ornithologist, on whom Brian was the recognised authority), and *A List of the Birds of Spurn, 1946-1985*, again the product of detailed research.

Brian also attended two meetings of the Protection of Birds Committee of the YNU, as a briefly co-opted member of it, in autumn 1963 and spring 1964, essentially to help clarify a shooting incident at the Humber Wildfowl Refuge reported to the Committee by concerned birdwatchers from Doncaster and Rotherham.

In 1978, several years after his marriage to Shirley, and three years before his retirement from Hull University, Brian was also elected YNU Divisional Secretary for Vice-County 61, with all the duties that that post entailed, a position he held, again, until his death.

Following his retirement and subsequent move to Hunmanby he also became an active member of the Scarborough Field Naturalists' Society, serving on its committee from 1984-86. Other duties which he took on or continued to perform after his retirement included the Wildfowl and Wetland Trust Organiser for National Wildfowl Counts for North Humberside and parts of North Yorkshire (since 1989 reduced to the Driffield/Malton/Scarborough areas) and, jointly with Shirley, Regional Representative and surveys organiser for East Yorkshire (north) for the British Trust for Ornithology (both Brian and Shirley had been active members of the BTO for many years before this). Shirley continues to act as Waterfowl Counts Organiser in the Driffield/Malton/Scarborough area.

Latterly, as a result of his long term interest in the chalk grasslands of the Yorkshire Wolds, Brian also became a member of the Wild Flower Society and, briefly, of the British Butterfly Conservation Society, both interests which he pursued with enthusiasm locally, providing valuable information to bodies such as English Nature, and thus assisting in the establishment of new Sites of Special Scientific Interest in his area.

In the best sense of the term, and in the best traditions of British amateur field natural history Brian was a good, old-fashioned, all-round naturalist, with a quick eye, an enquiring mind, a ready understanding of the ecology of the various aspects of the natural environment in which he was interested, and with an eagerness to share his enthusiasm and knowledge with others. In terms of his personal commitment, he was of the very stuff of which organisations such as the YNU, BTO and the local societies and committees which he so loyally served are made, and will continue to need. He is sorely missed by those he served and all those who knew him. We give thanks for the contribution he made, we are greatly saddened by his passing, and we offer our sincere condolences to his wife Shirley, who provided him with such wonderful support and companionship throughout the very happy years of their marriage.

M. Densley

WILLIS GEORGE BRAMLEY (1897-1992)

Willis George Bramley was born at Fairburn, about ten miles west of Selby, on 12th November 1897, the year in which the British Mycological Society was formed, following a Y.N.U. Fungus Foray based on Selby. He died, aged 94, in Malton, Norton and District Hospital on 1st April 1992 and was buried at Pickering on 6th April.

His family were well known farmers in the Fairburn area and Willis, as he was always known, continued in farming with his two brothers in Bolton Percy, near Tadcaster. Here he and his family occupied one of the farm cottages at Pallathorpe. During the 1950s, though, Willis left the family farming business and took his own family to Pickering, in North Yorkshire, where he bought a much larger house with a large garden. From here, he worked for other farmers till he reached retirement age.

Willis had a life-long interest in the outdoor world and in natural history. Early in life he became a member of the Y.N.U. and was quite prepared to sleep under a hay stack when he cycled to field meetings about Yorkshire.

At this time, birds were, perhaps, his strongest interest and he was a member of The Protection of Birds Committee from 1926 until 1931. He became a competent flowering plant botanist, an ability which served him well in his later studies of rust fungi.

Between 1941 and 1947 he rendered service to the Y.N.U. as Divisional Secretary for VC 64.

The writers first met Willis at meetings of the York & District Field Naturalists' Society, for which he was Mycological Recorder over a long period of years and of which he served a period as President. At this time, the Society met in the Yorkshire Museum and Willis came into contact with the then keeper, Reginald Wagstaffe, primarily an ornithologist but also keen on beetles. From then on, Willis always carried a box of glass tubes into which to put any beetles he came across, for Wagstaffe. He probably learnt a good deal from Wagstaffe, an enthusiastic and widely informed man.

Willis himself records another lapse into entomology, at the Horton-in-Ribblesdale Whitsun meeting of 1941. "The weather was not suitable for the collection of much except water beetles, to which task the writer was degraded for two days". K.G.P. remembers well the sight of Willis, W. D. Hincks and T. Stainforth crouched over peat holes on Pen-y-ghent in the rain.



FIGURE 1
Swinton Park, Masham c. 1947

In the best traditions of British natural history, Willis was always ready to help younger people. The writers remember a Sunday in 1948 when he took them, riding bicycles, to see Fairburn Ings, finishing with tea with some of his relatives. After we began collecting rust fungi, Willis used to give us specimens of some of his more interesting finds.

It was in mycology that Willis developed and displayed the collecting skills and taxonomic expertise that put him among the best Yorkshire naturalists of this century. We believe it was A. E. Peck, from Scarborough, who first interested Willis in fungi. He also acknowledged a great deal of early help from F. A. Mason (1878-1936), a friendly and popular Y.N.U. member who was Recorder to the Y.N.U. Mycological Committee, to which Willis was elected in 1921. He, in turn, became Recorder in 1935, at first jointly with Dr. John Grainger, and then, from about 1946, as sole Recorder. He continued in this capacity for 28 years until 1974, after which Dr. Tom Hering took over.

During these 28 years there were over 50 spring and autumn forays on which Willis prepared reports for *The Naturalist*. In addition, he wrote many reports on mycology for the Y.N.U. general field meetings. Some of the forays attracted some of the best British mycologists – A. A. Pearson, E. W. Mason and C. G. C. Chesters, for instance. The writers were among the (then) young Y.N.U. members who listened respectfully to the pronouncements of the experts. Willis was not beyond a little mischief and he was behind some judicious concoctions of spores on slides submitted to the experts.

Half a dozen of the 1940-1950 forays were based on Thornton Dale and the mycological opportunities revealed were what determined Willis to move house to nearby Pickering. Some of the foray reports listed over 200 species and Willis must have worked very hard indeed at his own identification work and in badgering the experts for their lists and then collating them for *The Naturalist*. It must have been especially hard while the family was at

Pallathorpe. Willis had to clear his microscope and books from the kitchen table by 10.00pm for his wife to lay it for breakfast.

However, it was during his Recordership that Willis was in touch with many of the leading professional and amateur mycologists in Britain. They and he benefited and he became one of the best amateur mycologists ever to have worked in the British Isles. Though Willis worked at most groups of fungi, his favourites probably were the plant rusts, with regard to which he has several mentions in the standard British text, *British Rust Fungi* by Malcolm Wilson and D. M. Henderson. Fortunately, through the work of Tom and Shirley Preece and a distinguished team of editors, the results of Willis' years of collecting and recording, are available to all in *A Fungus Flora of Yorkshire* (1985).

Acknowledgement from the British Mycological Society came in 1990 when it awarded the Benefactor's Medal to Willis "for his outstanding contribution to Yorkshire Mycology". The writers were given the pleasant duty of delivering the medal to him personally just before Christmas. They found Willis in Malton Hospital on a short visit for routine treatment. He was in his usual hearty form and had just tried on a Father Christmas outfit and was looking forward to distributing presents in the Children's Ward on Christmas Day. With his white beard he really looked the part.

We will remember Willis as a big man (K.G.P. shared a bed with him at the 1942 Horton-in-Ribblesdale meeting), always hearty and cheerful and ready to help and with a fund of stories of meetings, mycologists and other naturalists from the past.

The sorrows of life did not pass him by, for his wife died many years before him, he nursing her in her last illness.

Perhaps unusually for a farmer, Willis was a keen gardener and after his wife's death he became a meticulous housekeeper. He was an excellent correspondent and exhibited fine clear handwriting up to the last.

The young Willis Bramley knew W. N. Cheesman (1847-1925), from Selby, in the last four years of the latter's life. Cheesman spent some of his earlier life in London and was proud of having known Charles Darwin and of having visited his home. So, those of us who knew Willis have shaken the hand of a man who shook the hand of a man who shook Darwin's hand. For the origin of this thought, we are indebted to the late Miss E. M. Blackwell, whose "Links with past Yorkshire mycologists" (*Naturalist* 1961: 53-66) gives a fascinating account of the mycological scene into which Willis came. So, the continuity of natural history is preserved through the lives and deaths of its students.

J. & K. G. Payne

BOOK REVIEWS

The Mole by R. David Stone. Pp. 24, with 27 b/w and colour illustrations. Shire Publications, Princes Risborough, Bucks. 1992. £1.95 paperback.

David Stone has produced yet another addition (No 61) to this excellent Shire Natural History Series. Although born in Ireland, a country without moles, he has studied moles and related species throughout the world. He describes their anatomy and explains how they can survive in total darkness and how the tunnel system is created.

The European mole (*Talpa europaea*) is one of the commonest small mammals in Great Britain and instantly recognisable, but it is a rare privilege to catch a glimpse of one. Unfortunately many of the photographs do not make up for this as they have been seen before. The line drawings have however been produced especially for this booklet.

A highly readable, value for money, introduction to a fascinating mammal.

The Wren by Edward A. Armstrong. Pp. 24, with full colour and black and white photographs. Shire Publications, 1992. £1.95 paperback.

This is the twenty-sixth Shire Natural History booklet dealing with a single species of bird, each written by an authority on the bird covered. Edward A. Armstrong, one of a long line of parson-naturalists, is well known as the authority on the wren, one of our commonest yet little known species. Armstrong died in 1978 and the present text has been adapted from his earlier writings by his son, Patrick H. Armstrong. The resultant booklet, which succinctly covers all aspects of the species' life style, is well worth a place in the library of every birdwatcher.

AJW

The Robin by Mike Read, Martin King and Jake Allsop. Pp. 128, with 86 full colour photographs and several line drawings. Blandford, 1992. £16.99.

This beautifully illustrated book is one I would give to anyone starting out on a single species study. The authors, the first two of whom are also professional photographers, have gone to a great deal of trouble to give an accurate, and yet readable, account of the life of the robin. The quality of the photographs is outstanding, not only in their colour rendering, but also their variety and interest.

On the fly sheet it states that Jake Allsop has a life long interest in ornithology and is a qualified ringer for the British Trust for Ornithology. Although all three authors have contributed to the field work, I assume that Jake Allsop has carried out most of the field studies and written up his findings in a manner such that those without a scientific training can understand. The chapters describe various aspects of the robin's life, from taxonomy, through courtship, nest building, territory holding, feeding and migration. There is a final chapter on photographing the robin, followed by an extensive bibliography.

The text makes reference to David Lack's classic study *The Life of the Robin*, published in 1965. The authors freely quote from this highly readable study which I remember thinking that nothing could surpass. However, in this recent study, we not only have new information, but also better illustrations; *The Robin* is thus a complementary volume to David Lack's classic.

For me this book showed how much pleasure one can get out of observing a common species, such as the robin. Today, with so much pressure being placed on much of our wildlife, most of us have to study those animals and plants we find in our local environments, such as our own back gardens. *The Robin* gives us a flavour of just that sort of activity, and I would highly recommend it to any aspiring ornithologist.

MJAT

The Pocket Guide to Freshwater Fishes of Britain and Europe. Pp. 144; **The Pocket Guide to Saltwater Fishes of Britain and Europe.** Pp. 176. By Alwyne Wheeler; illustrated by Colin Newman. Dragon's World. 1991. £6.95 each. Royalties to Royal Society for Nature Conservation.

These eminently practical handbooks have waterproof covers and jackets, and are spirally bound so that they lie flat wherever they are opened. Each species has a page to itself with a description and account of the life cycle by an acknowledged expert, and an illustration, usually in colour. In *Freshwater Fishes* the number of species (130) is inflated by the inclusion of fishes from southern and south eastern Europe. For some of these, for instance from Greece, little is known of the life cycles, and the illustration is a black and white drawing because no colour references were available to the artist. In the lucid but all too brief introduction Alwyne Wheeler gives a short account of the history of the European fish

fauna and mentions the gloomy prospects for a number of species consequent upon reduced water flow and increased pollution in many rivers. In *Saltwater Fishes* the number of species (161) is also inflated by the inclusion of Mediterranean fishes, including some recent arrivals through the Suez Canal. In the introduction the author comments on the comparatively large number of species (about 250, including some caught only once or a few times) in British waters, and gives reasons for this, such as the wide continental shelf and the North Atlantic Drift; also some oceanic species migrate northwards in summer. These guides can be thoroughly recommended to fishermen, ichthyologists and to the general naturalist.

FHB

A Review of the Scarce and Threatened Coleoptera of Great Britain. Part 1 by P. S. Hyman, revised and updated by M. S. Parsons. Pp. 484. UK Joint Nature Conservation Committee. 1992. £18.00 plus £3.00 postage and packing from JNCC, Monkstone House, City Road, Peterborough.

Roger Key in the Introduction states that the aim of this review is to identify the scarcer species of beetles in Britain and those under threat and to suggest ways of conserving them. The review will be in two parts. The present first part concentrates on 70 of the more readily identifiable and popular families of Beetles. Those covered are predominantly terrestrial as the water beetles have been considered elsewhere, although a status list of water beetles is given in Appendix 1. 1043 species are considered and easy reference to them is made via Appendices 2 and 3.

One section deals with the study of beetles in Britain, with particular reference to the various recording schemes. A call is made to measure the degree of 'habitat fidelity' of species and for studies on the biology of species which are needed to develop management techniques for conservation. A review of the literature of British beetles includes the listing of publications with keys to species level for many beetle families.

Detailed definitions and criteria of status categories are given with the national notable category renamed "national scarce". Defining status in terms of Red Data Book and nationally scarce categories arises from the natural history tradition and is readily understood by politicians. However these statuses are perhaps not the best way to measure biodiversity which would seem to increase with species which are sole representatives of genera or families, or of genera and families with few species and with species which are representatives of the more primitive genera and families.

The major part of the review is devoted to the species accounts which includes the name of the species, its family and status with distribution; details of habitat and ecology with possible threats and suggestions for management and conservation; status is reviewed and indicator species with their grading are given for species indicative of the continuity of mature habitat; and finally a list of published sources. This mass of information will be invaluable to the coleopterist and to the wildlife manger, providing the beetles can be identified.

MEA

The Fragile Environment edited by Laurie Friday and Roland Laskey. Pp. x + 198 including 50 b/w photographs and 25 line drawings and maps. Cambridge University Press. 1989 £10.95. Paperback.

In this volume eight authorities on environmental matters each provide a chapter on aspects of the environment in which they have particular expertise. Originally the contributions were presented as the Darwin College Lectures on "Man and the Environment", given in Cambridge in 1987. The book clearly reveals its origins in that each chapter is discrete and has its own style, with few links between the various contributions. Nevertheless, the eight

contributions provide an excellent non-technical guide to many contemporary environmental issues.

The first chapter provides an overview of man's impact on the environment, particularly over the last 38,000 years when fire has been employed to bring about changes in vegetation. It points out that current human activity is a continuation of a long tradition of deliberate and inadvertent human actions which had already profoundly changed the world prior to the present century. This leads smoothly into Chapter 2 which gives an account of the rates of loss of the world's forests and their associated biota in recent years. This is in turn followed by chapters which deal with human attitudes towards animals and an explanation of the difficulties and uncertainties associated with attempting to determine the number of species of organism in the world and the rates of species extinction.

Chapter 5 reviews the occurrence of famine and provides insights into the complex issues which need to be addressed if adequate supplies of food are to be provided for the growing populations of the Third World. This is followed by an account of the rates of mineral resource depletion and an optimistic view of the prospects for a transition to an age of resource substitutability.

Chapter 7 provides a systematic and wide ranging review of changing climates; it also deals with the controversy of whether rising carbon dioxide levels pose a significant threat to the present day pattern of global climates. The final chapter uses a series of well chosen photographs taken from space to illustrate many of the themes of environmental change which have been presented earlier in the book.

Though the work has clearly been produced for a non-specialist audience and does not cover all aspects of concern about the changes which threaten the earth's fragile environments, it contains a wealth of clearly presented ideas and information. As such it will admirably meet the needs of many people who take a serious interest in the problems caused by human impact on the environment and who wish to broaden their awareness of the complex issues which are involved.

DEC

Global Patterns: Climate Vegetation and Soils by Wallace E. Akin. Pp. ix + 370 including 142 b/w charts, line diagrams, maps and photographs. University of Oklahoma Press. 1990. £35.

This volume clearly presents a wealth of basic factual material. It is heavily weighted to a North American market and much of the data is drawn from the United States, although there are notable exceptions such as an illuminating case study of the origin and reclamation of the Danish heathlands.

The book is divided into three discrete sections, each supported by a separate well chosen bibliography. Section one, which deals with the atmosphere and climate takes up almost half of the book. This section consists of four chapters covering atmospheric attributes, global patterns of climate, hydrology, and climatic change. All the subject matter is clearly presented in a non-technical manner so that it can be readily followed by readers with a limited scientific background. However, one consequence of this approach is that fundamental explanations of principles are largely omitted; for example, whilst wind systems feature prominently in the work, there is only a sketchy outline of their origin and behaviour, and the reader is told little more than that, "... air moves because of differences in atmospheric pressure and weather is the product of this movement".

Vegetation is dealt with in two chapters in the second part of the book, one outlining the nature and classification of plant communities and the second providing an overview of the character of the world's major vegetation regions. Several sections are very brief: tundra and alpine communities are dealt with in less than a page and even tropical rain-forest gets only three pages and one photograph.

The third and final section of the book covers soils. A brief but effective introduction explains the nature of soils and the factors which influence their evolution. This is followed

by a chapter which unfortunately for the non-American student is dominated by an account of the soil taxonomy systems of the United States Department of Agriculture and soils outside of the United States receive scant attention.

Overall the volume provides a useful but slightly "potted" compilation of information on climates, soils and vegetation, though its attractiveness to European readers will be curtailed because of its strong weighting towards North American interests and its price.

DEC

CONTRIBUTORS

- Abbott, P. P. 43-45
Archer, M. E. 19-25, 26, 145
- Blockeel, T. L. 41-43
Brightman, F. H. 144-145
- Caverhill, A. R. 112
Cook, L. M. 46-47, 77-78
Cotton, D. E. 145-146, 146-147
- Davis, A. J. 27-30
Delany, M. J. 45-46
Densley, M. 139-141
Denton, M. L. 71-75, 111-112
- Flint, J. H. 69-71, 137
- Goulder, R. 127-131
- Hale, W. H. G. 62
Hamblen, D. J. 78-79, 98
Headley, A. D. 80, 132
Hodgkiss, I. J. 98
Horsman, F. 50-52
Howes, C. A. 109-111, 133-137
- Jenkinson, L. S. 27-30
- Lawrence, I. C. 18
Limbert, M. 113-125
Lunn, J. 53-62
- Magee, L. 76, 77
Massey, C. I. 143
- Norris, A. 31-40, 46, 131-132
- Pashby, B. S. 81-98
Payne, J. 26, 76, 141-143
Payne, K. G. 141-143
- Ratcliffe, D. A. 49-50
Richardson, D. T. 111, 126
Roworth, P. C. 5-18
Rumsey, F. J. 53
- Seaward, M. R. D. 31-40, 78, 79, 80, 112, 138
Skidmore, P. 30, 47-48
Smith, C. J. 126
- Thompson, M. J. A. 144
- Wallis, A. J. 144
Wardhaugh, A. A. 99-108
Woroncow, B. 48
- Yalden, D. W. 63-68, 75

INDEX

Book Reviews

18, 26, 30, 45–48, 62, 75–80, 98, 111–112, 126, 132, 137, 143–147

Botany

The Backhouse Trichomanes, 49–50; James Backhouse Jnr (1825–1890) and the Killarney Fern, 50–52

Bryology

Y.N.U. Bryological Section: annual report 1990–1991, 41–43

Conchology

Limax maculatus, a slug new to Yorkshire, 131–132

Ecology

Loss of aquatic vegetation in a Wolds Winterbourne during perennial dryness, 127–131

Entomology

Aculeate wasps and bees of Skipwith Common and a comparison of Skipwith Common with Allerthorpe and Strensall Commons, 19–25; *Drosophila fenestrarum* from Leeds, a new record for northern England, with notes on larval feeding sites, 27–30; Entomological reports for 1987–1989 (Coleoptera), 69–71; Entomological reports for 1990–1991 (Coleoptera), 71–75

Lichenology

Progress in the study of the Yorkshire lichen flora, 138

Mammalia

Bats and their roosts in Cleveland and north east Yorkshire, 99–108; Deer drowning in canals, 133–137

Obituaries

William Arthur Sledge, 43–45; Brian Shaw Pashby, 139–141; Willis George Bramley, 141–143

Ornithology

Common bird census on Thorne Moors National Nature Reserve, 5–18; Ecology of Long-eared Owls wintering in south west Yorkshire, 53–62; Common Sandpiper population of the Ladybower Reservoir Complex, 63–68; The Humber Wildfowl Refuge: an experiment in wildfowl conservation, 81–98; Historical notes on the Starling in Yorkshire, 109–111; F. O. Morris's List of Yorkshire Birds, 113–125

Yorkshire Naturalists' Union

Archives of the Yorkshire Naturalists' Union, 31–40; Presidential address, 81–98

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